Patterns of Mortality Improvement over Age and Time for 201 Countries

Kirill Andreev

United Nations, DESA, Population Division, New York, United States E-mail: andreev@un.org

personal website http://www.kirillandreev.com

Disclaimer: The views expressed in the paper do not imply the expression of any opinion on the part of the United Nations Secretariat.

Definition

m_{xt} - death rate at age x and time t

$$r_{xt} = -ln\frac{m_{xt+1}}{m_{xt}}$$ - rate of mortality improvement at age x and time t (1)

Or in continuous time:

$\mu(x,t)$ - force of mortality at age x and time t

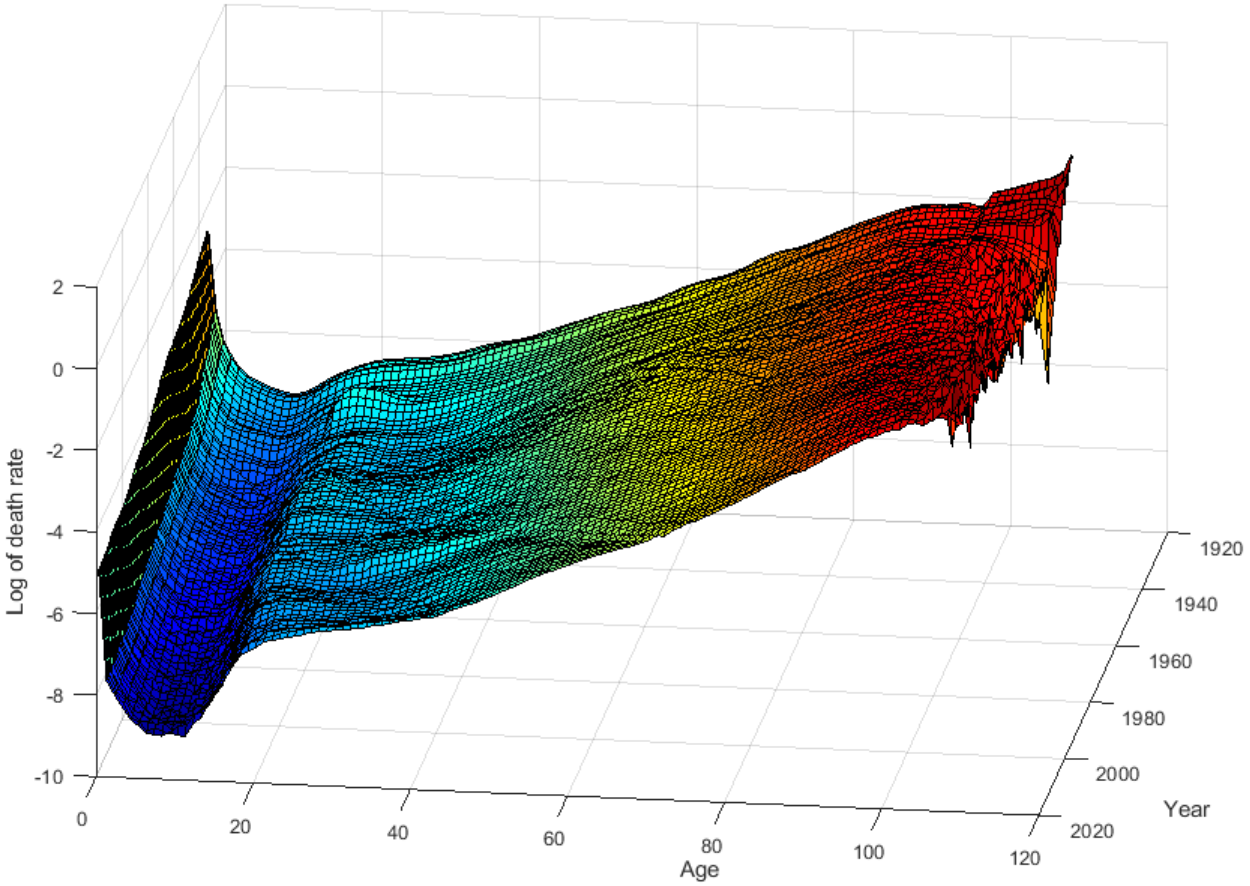
$$r(x,t) = -\frac{d}{dt}\ln \mu(x,t)$$ - rate of mortality improvement at age x and time t

Why we need it?

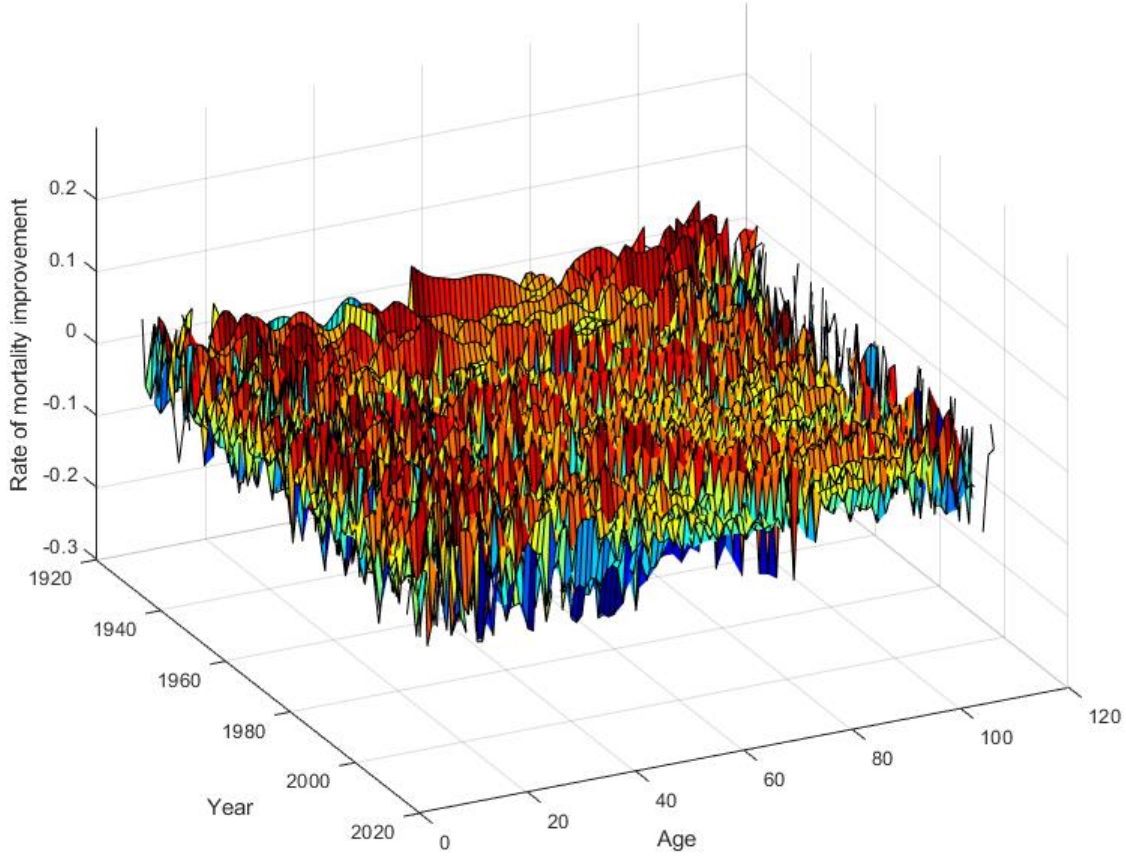
- Exploratory data analysis
- Presentation of trends in age-specific death rates
- Model building and evaluation
- Data quality assessment

Example: United States, Males, years 1933-2018

Log death rates, $\ln m_{xt}$

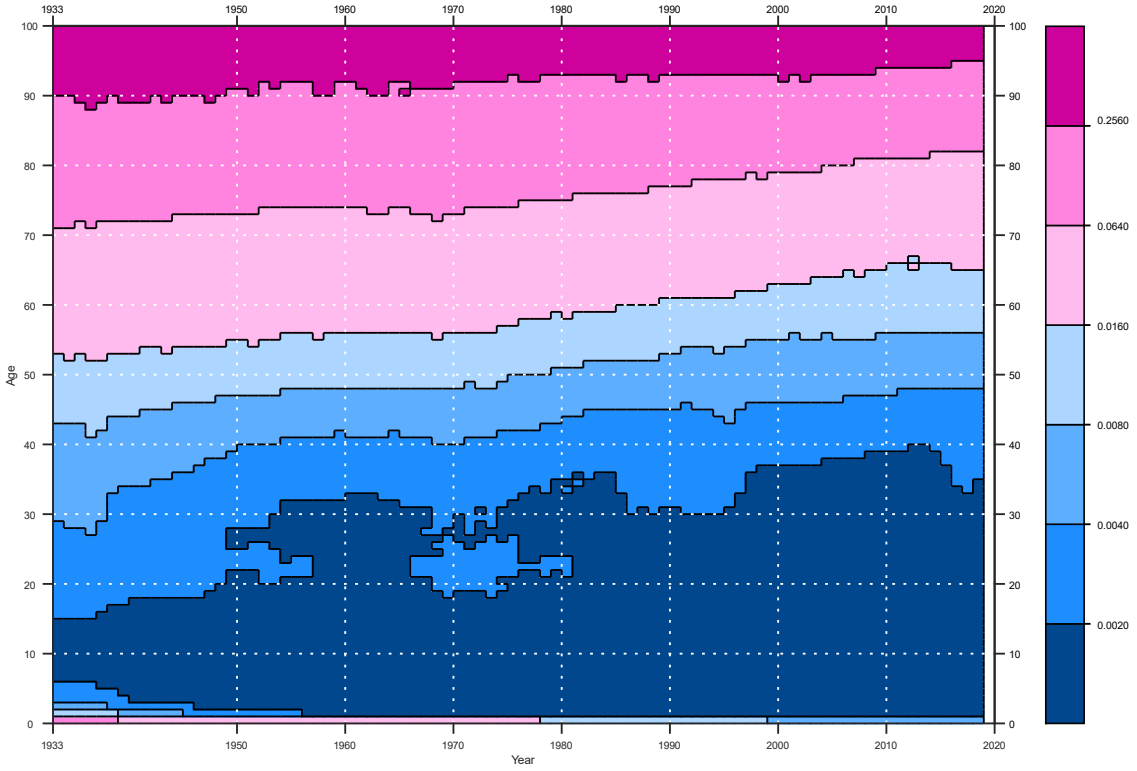


Rate of mortality improvement, r_{xt}

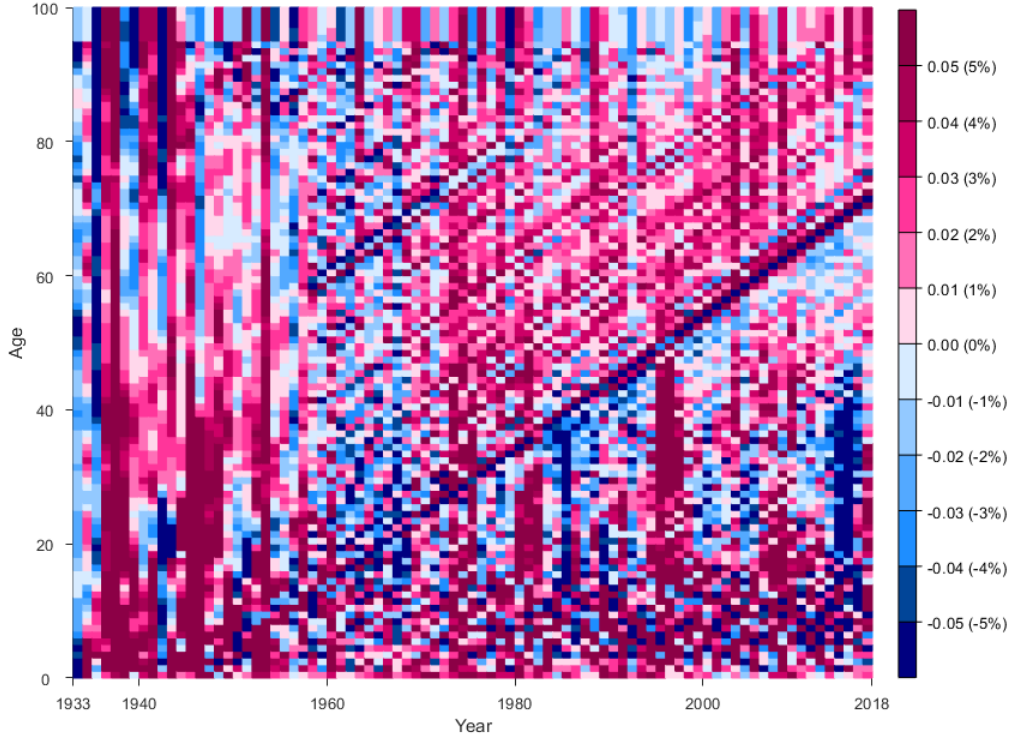


Example: United States, Males, years 1933-2018
Lexis Maps

Log death rates



Rate of mortality improvement



Estimation

Two approaches:

A) First smooth matrix of death rates, m_{xt} , then compute r_{xt}, with Eq. (1)
B) First compute r_{xt} from unsmoothed m_{xt}, and then apply a smoothing method

Smoothing methods

- Smooth each trend in an age-specific death rate
    a) moving average
    b) kernel smoothing / LOESS smoother
    c) smoothing spline
    d) Poisson regression incl. test of significance (Andreev, 1999)
- Smooth simultaneously over age and time
    a) 2-dimensional moving average or kernel smoothing
    b) tensor-product splines
    c) p-splines (Camarda, 2012)

Estimation (cont.)

There no strict criteria exist how degree of smoothing must be selected. For splines, for example, cross-validation is commonly used for automatic selection of a smoothing parameter.

All methods produce similar results for comparable degrees of smoothing (Andreev, 2018).

References

Andreev, K. F. (1999). Demographic Surfaces: Estimation, Assessment and Presentation, with Application to Danish Mortality, 1835-1995. Ph.D. thesis. University of Southern Denmark. Online at http://kirillandreev.com/1999_PhD/ and https://bit.ly/3n8HmpW

Andreev, Kirill F. *Estimating Pattern of U.S. Mortality Improvement over Age and Time.* 2018 PAA Meeting. Online at http://kirillandreev.com/2018-04-25_PAA/Andreev_US-Mortality-Improvements_PAA2018_Apr2018_Poster.pdf

Camarda, C. G. (2012). MortalitySmooth: An R package for smoothing Poisson counts with *P*-splines. *Journal of Statistical Software, 50*(1), 1–24.

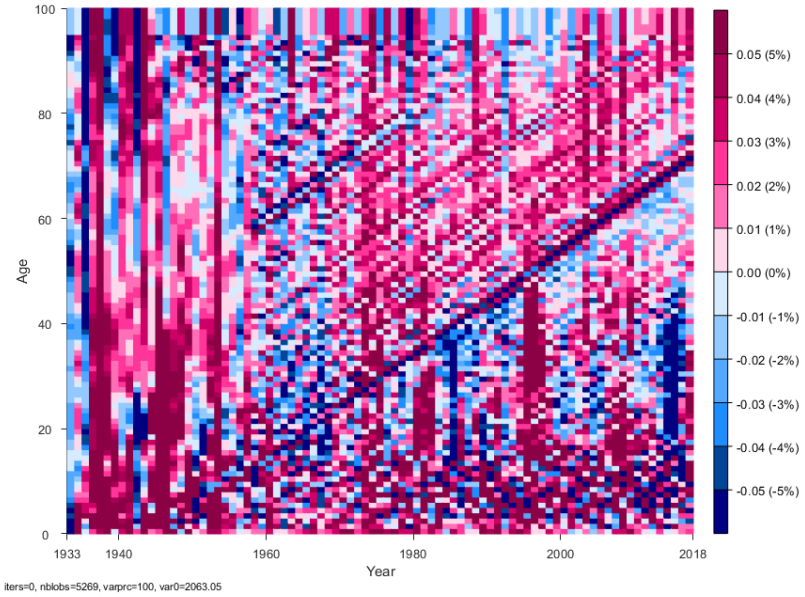
Estimation (cont.)

Iterative 2-dimensinal kernel smoother (gaussian 3x3 kernel)

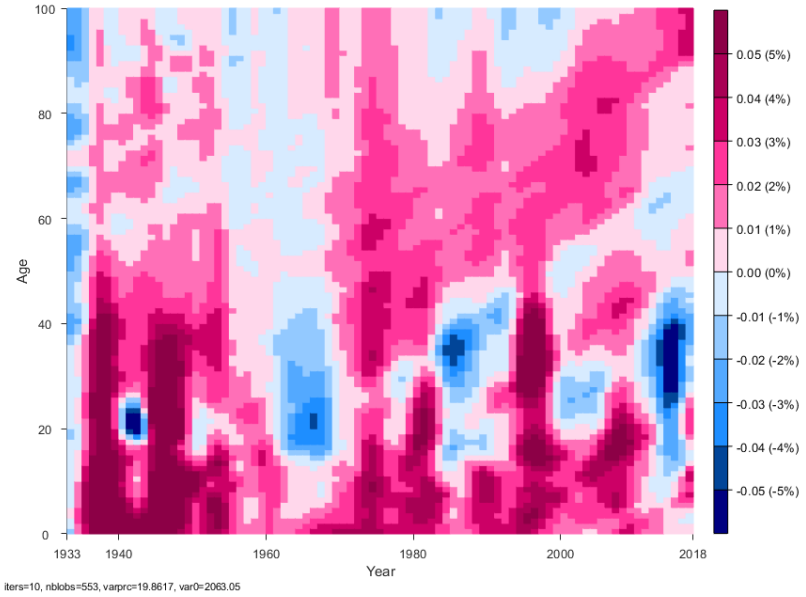
Smoothing criterion: number of blobs

United States, Males, 1933-2018

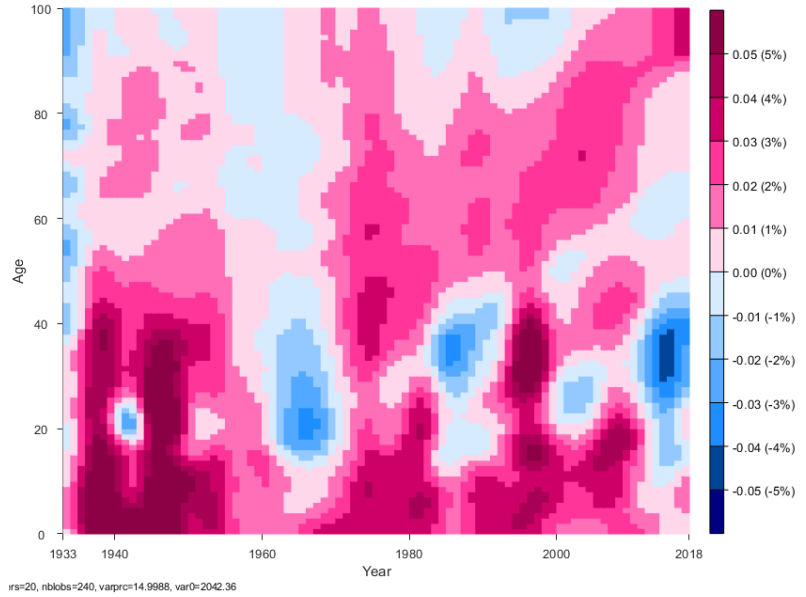
Number of iterations: 0 (no smoothing)



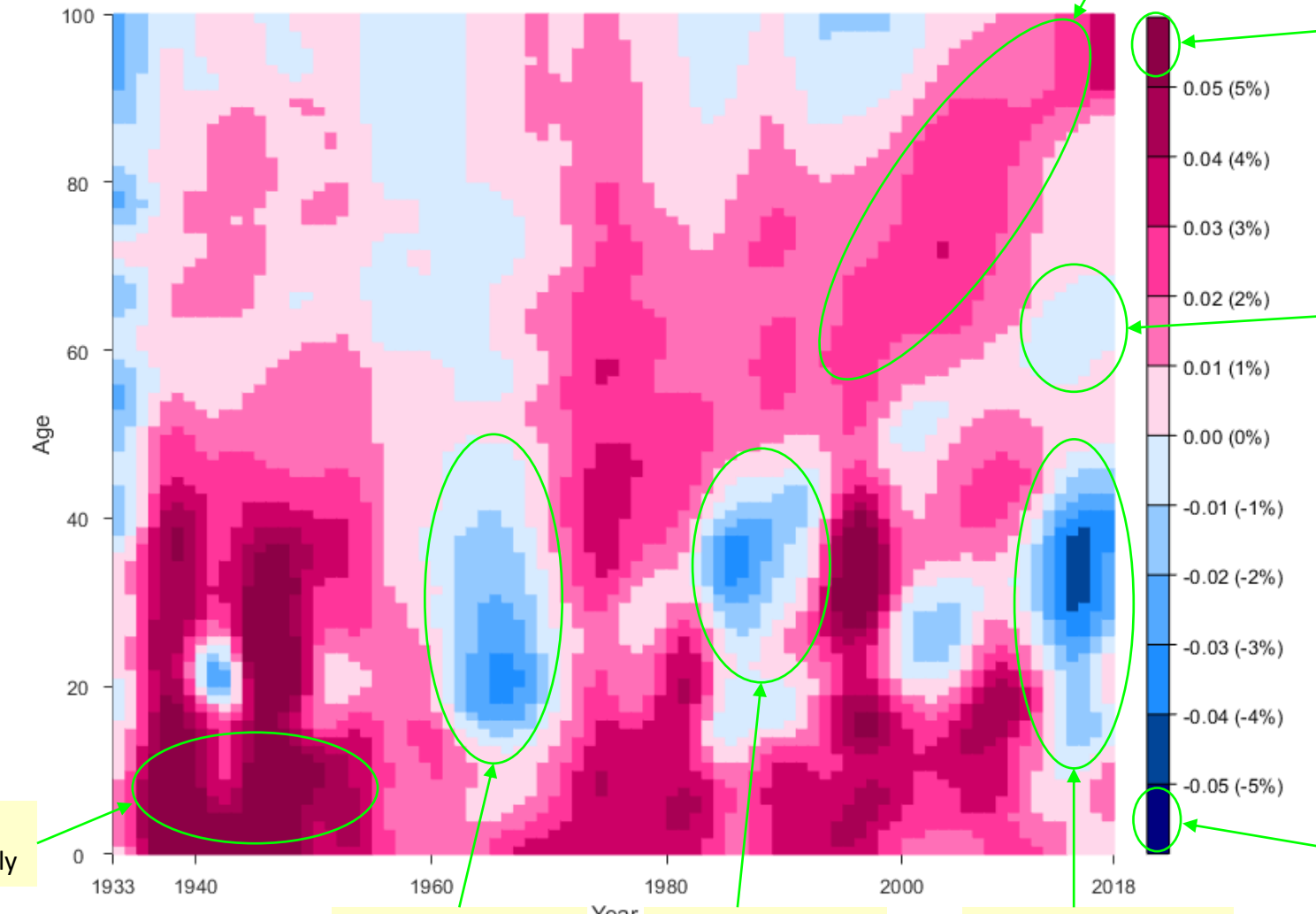
Number of iterations: 10



Number of iterations: 20 (final estimate)



United States, Males, 1933-2018



Age shifting pattern of mortality improvement

This color shows year and ages with death rates declining on average 5% or more annually

Recent increases in death rates at pre-retirement ages

Death rates declining by 5% or more annually

Increases in death rates in the 1960s

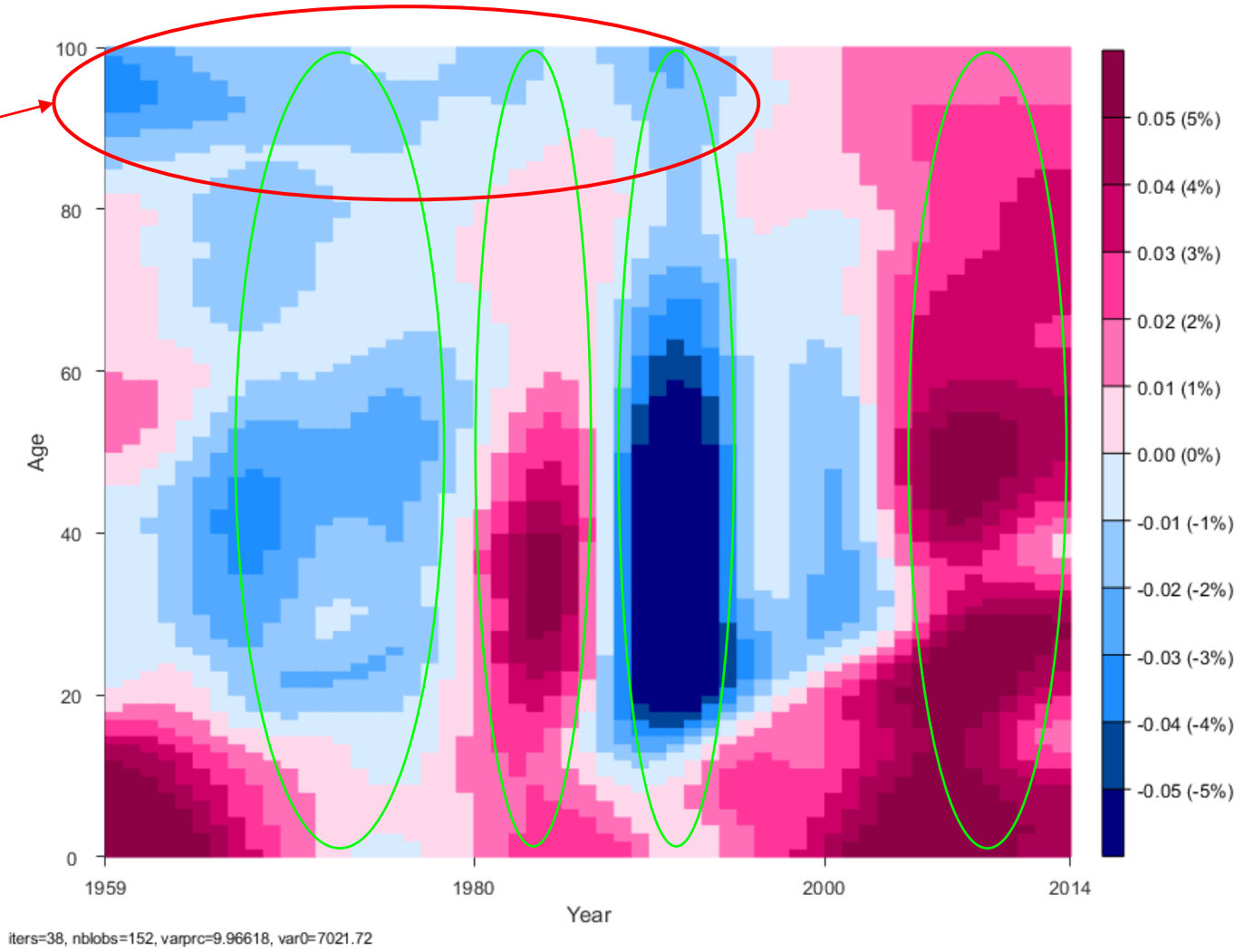
Increases in death rates in the 1980s

Recent increases in death rates at young adult ages, 'deaths of despair'

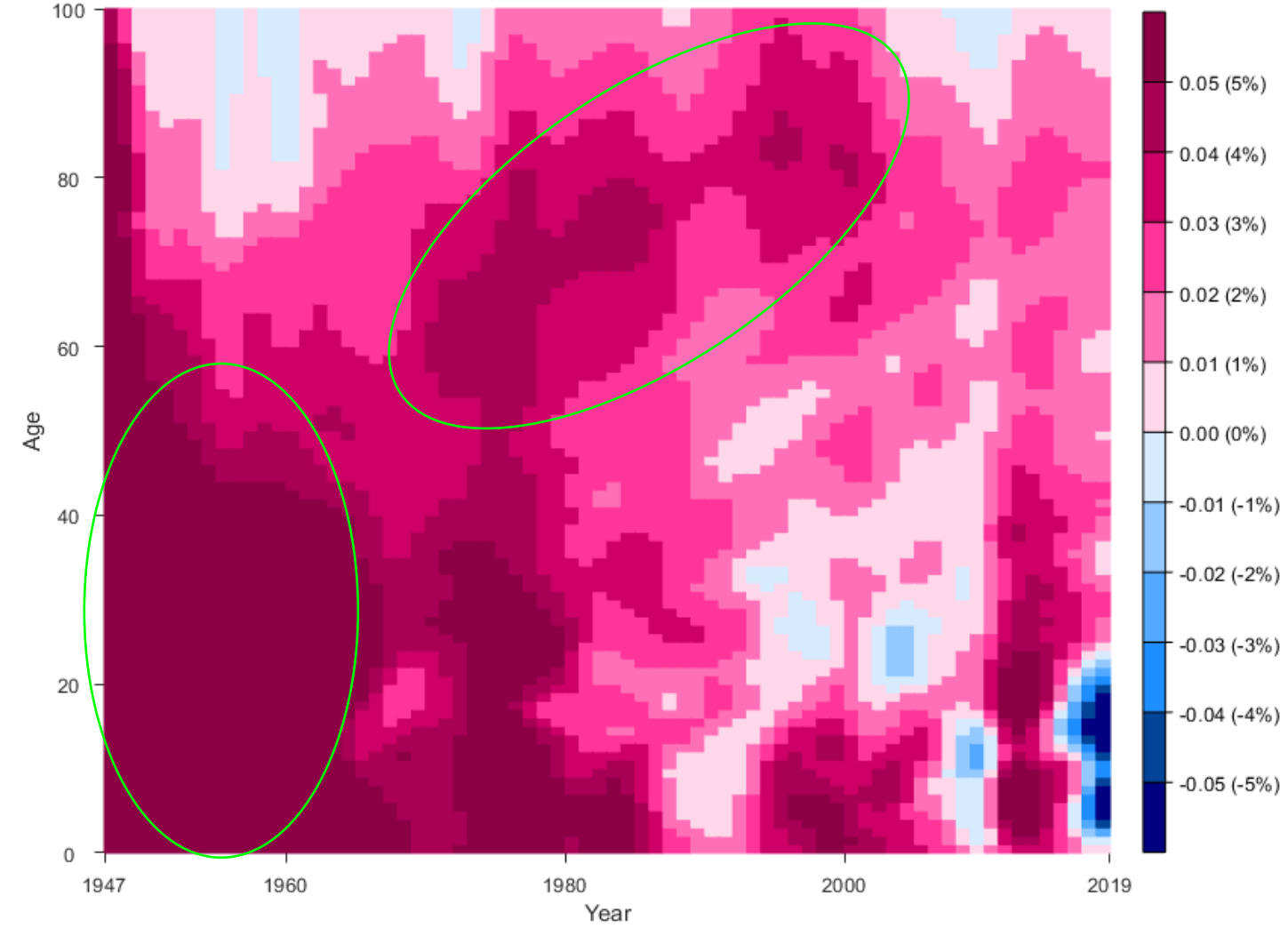
This color shows year and ages with death rates increasing on average 5% or more annually

Predominantly period pattern of mortality improvement Russia, Males

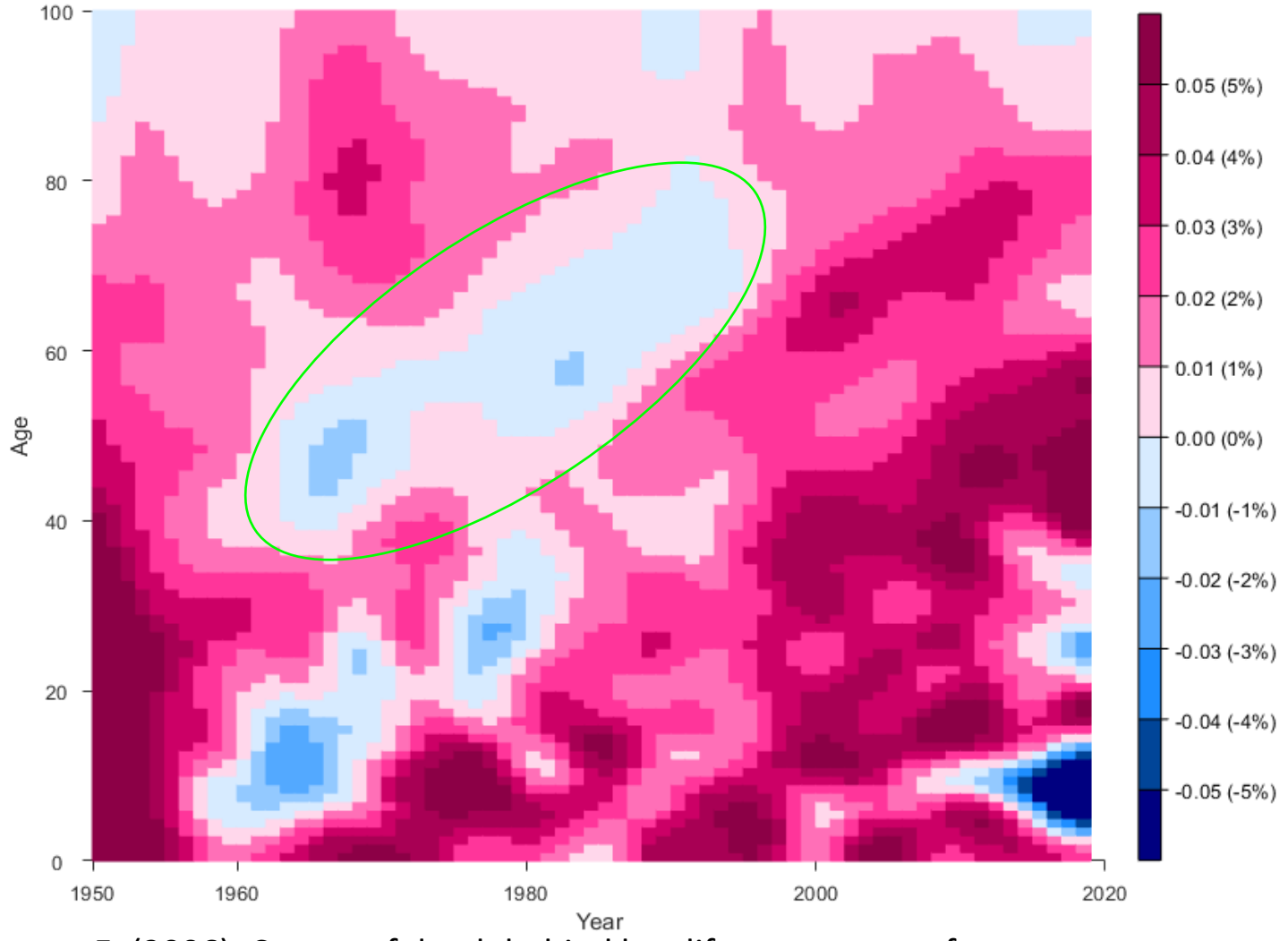
Increasing death rates at older ages point to data quality problems at older ages.



Age-shifting pattern of mortality improvement
Japan, Females

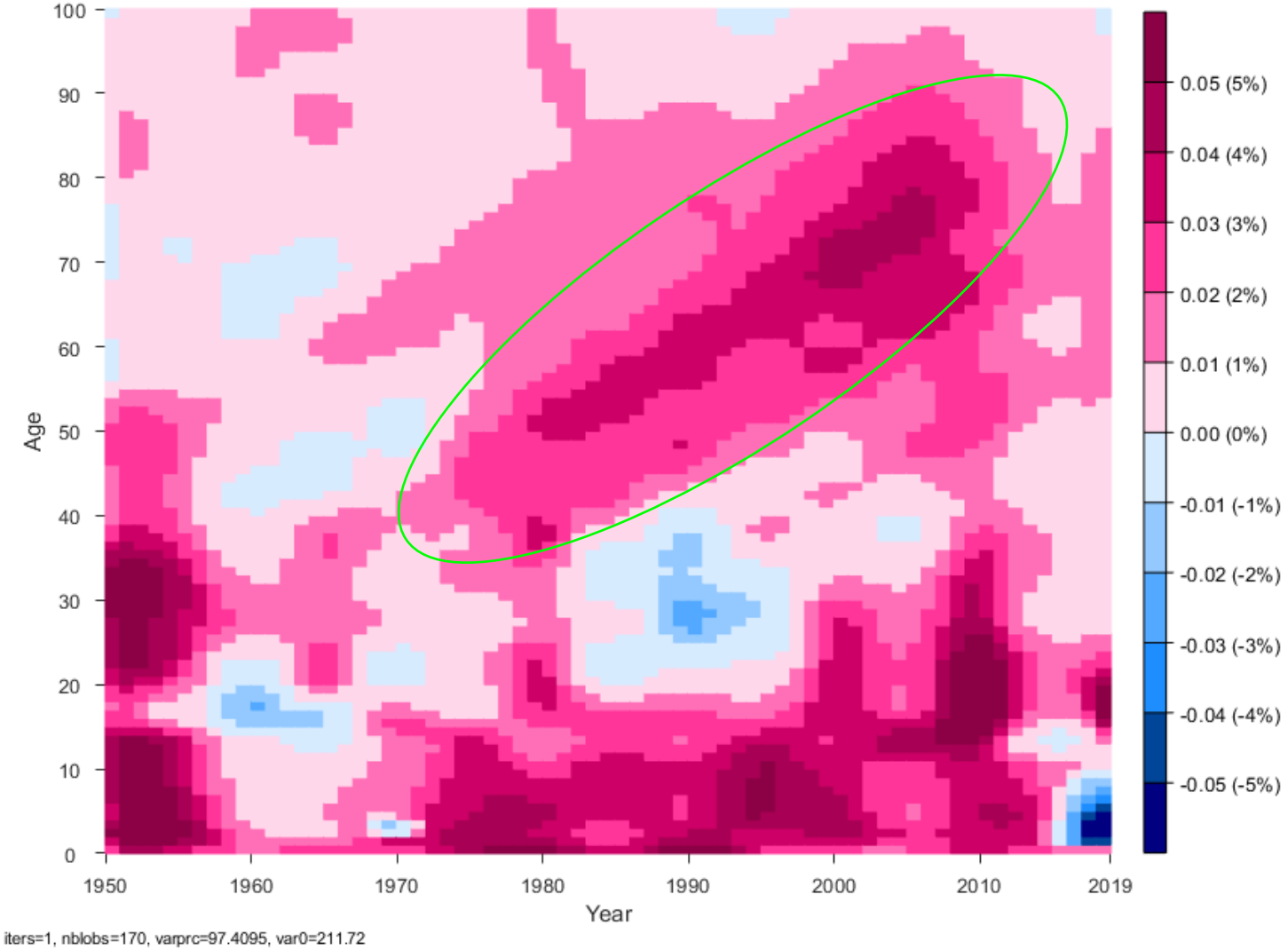


Cohort effect: deceleration of decline for specific cohorts Denmark, Females



Jacobsen, R., Keiding, N., & Lynge, E. (2006). Causes of death behind low life expectancy of Danish women. *Scandinavian Journal of Social Medicine, 34*(4), 432–436.

Cohort effect: acceleration of decline for specific cohorts
United Kingdom, Males

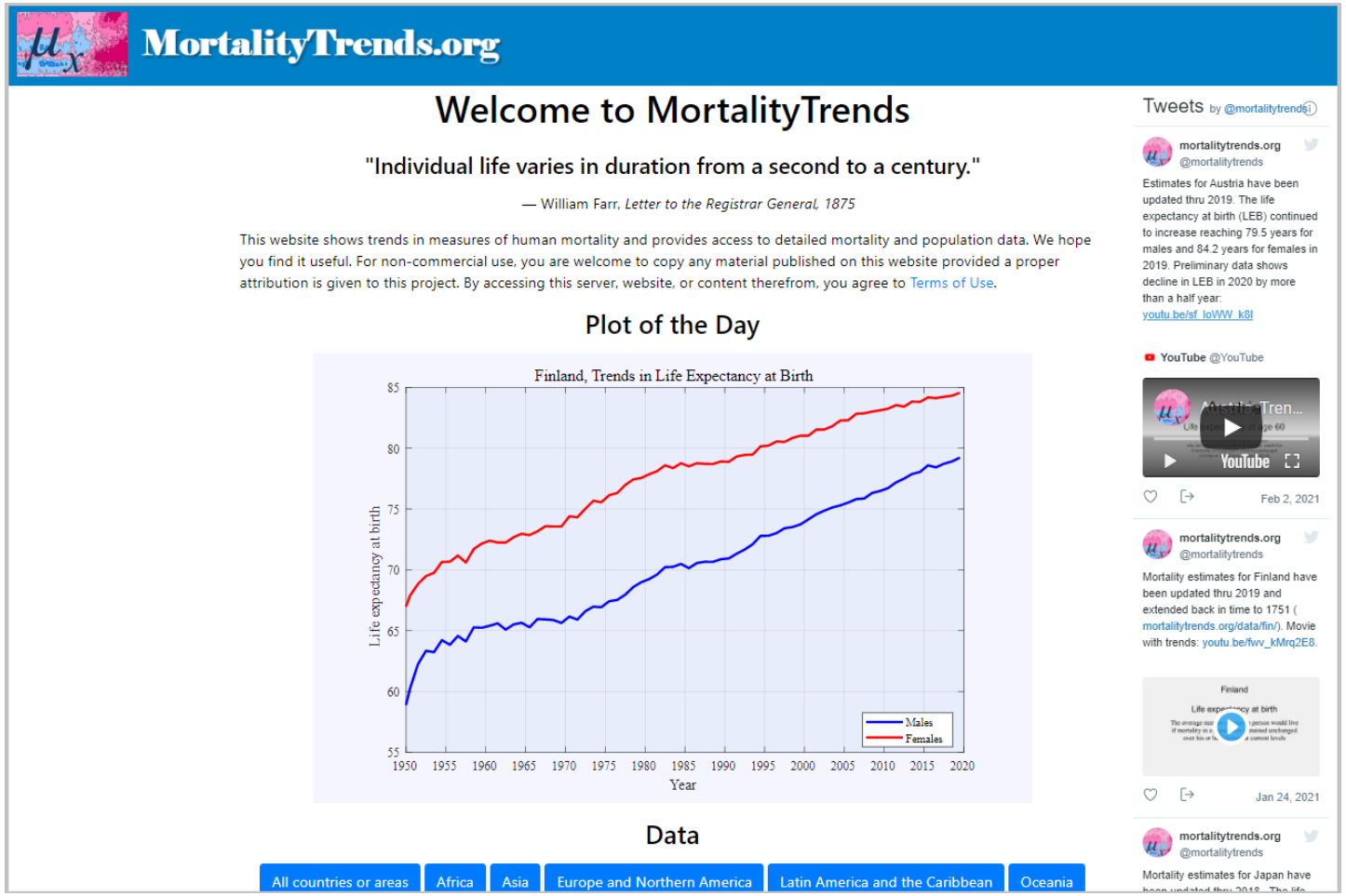


iters=1, nblobs=170, varprc=97.4095, var0=211.72

Mortality improvement patterns for 201 countries are available at

http://www.mortalitytrends.org/

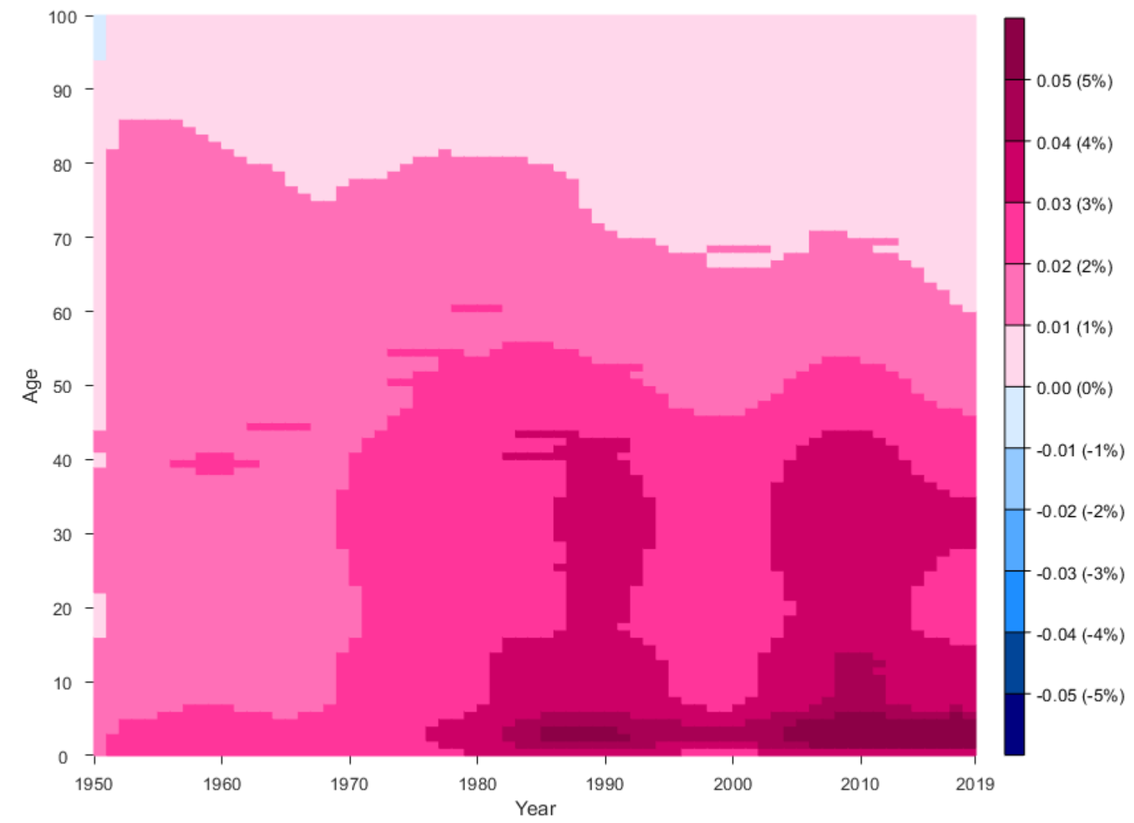
(work in progress)



Mortality improvement patterns for individual countries

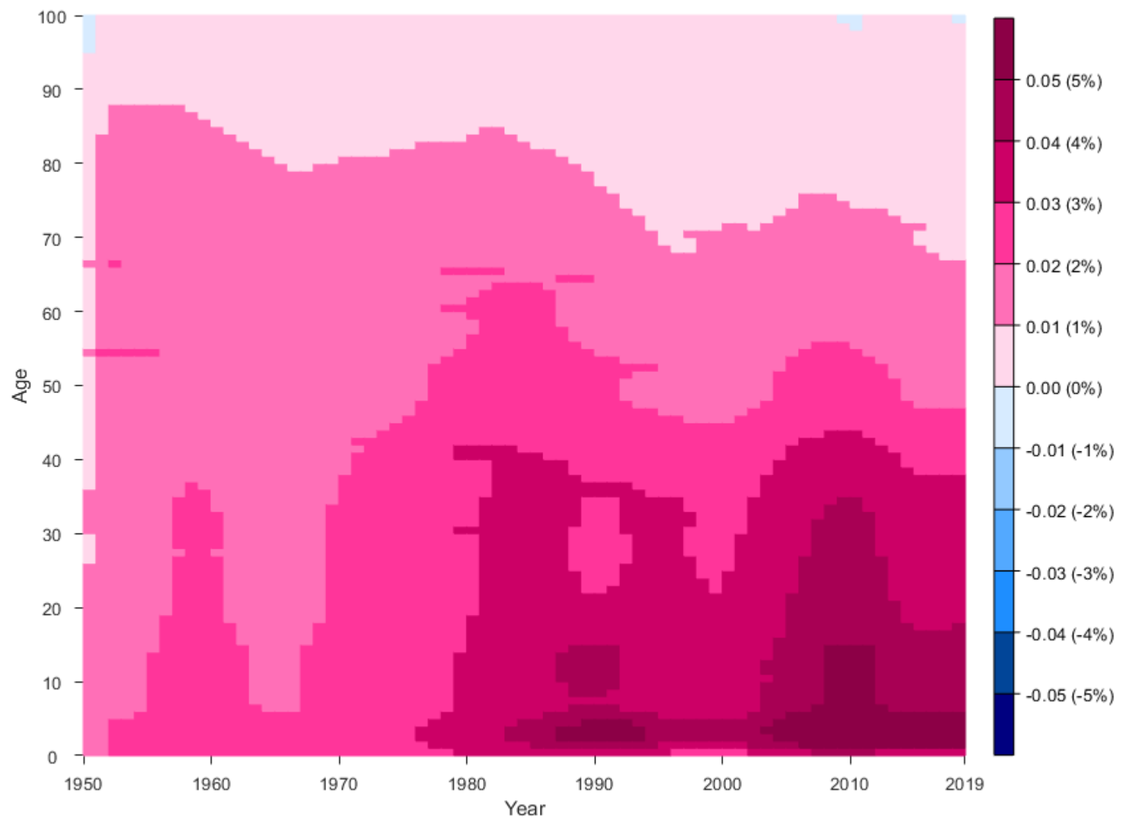
Afghanistan

Males



iters=1, nblobs=19, varprc=99.2817, var0=114.275

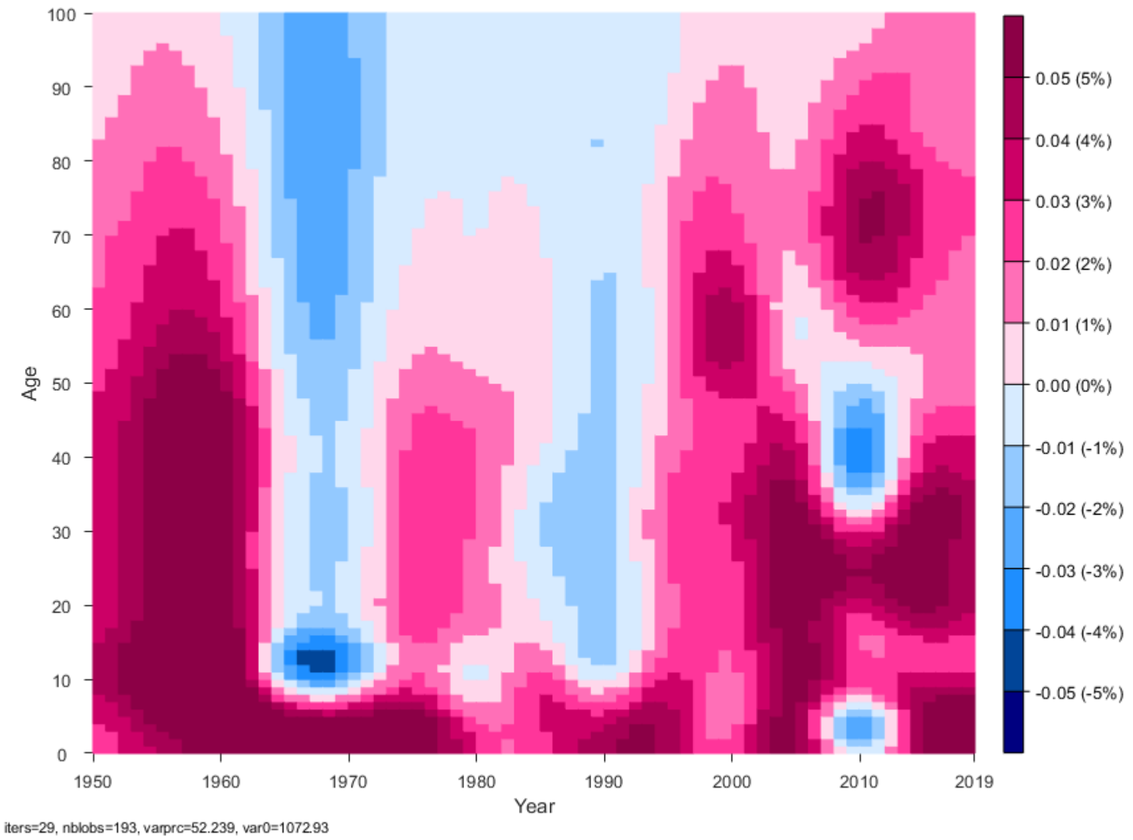
Females



iters=1, nblobs=24, varprc=99.4467, var0=140.464

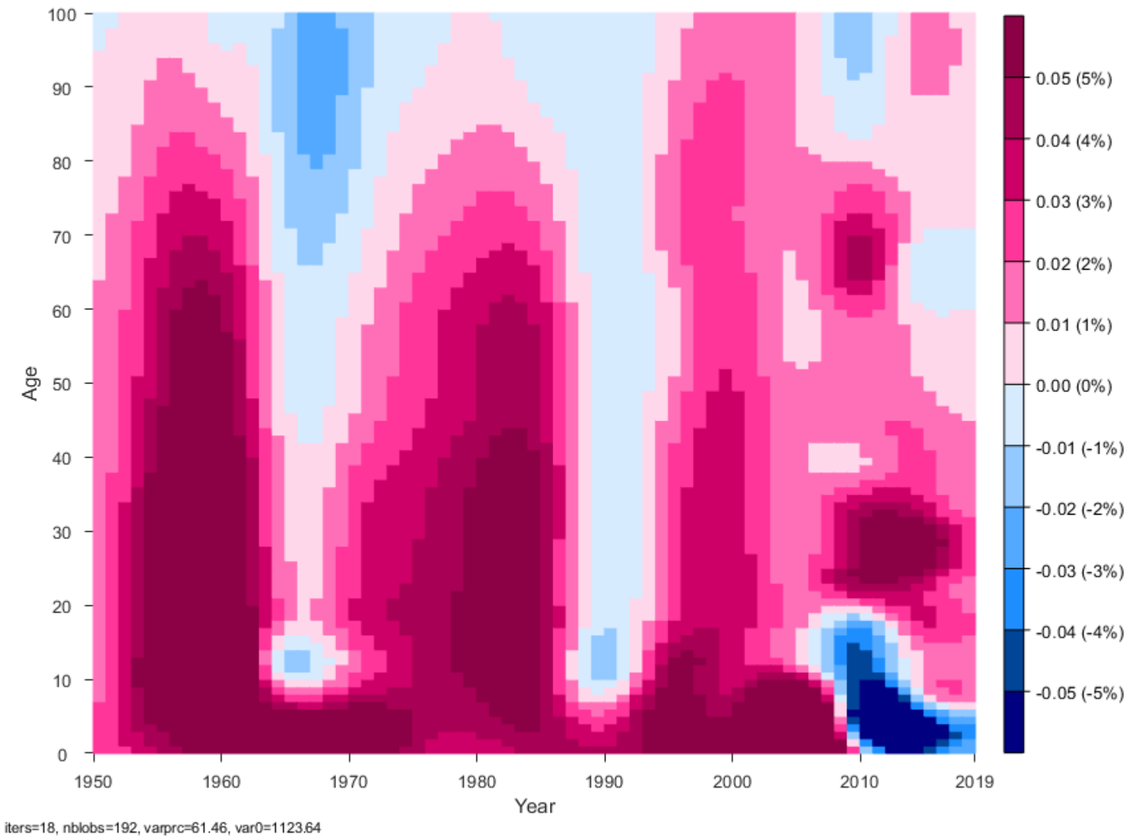
Albania

Males



iters=29, nblobs=193, varprc=52.239, var0=1072.93

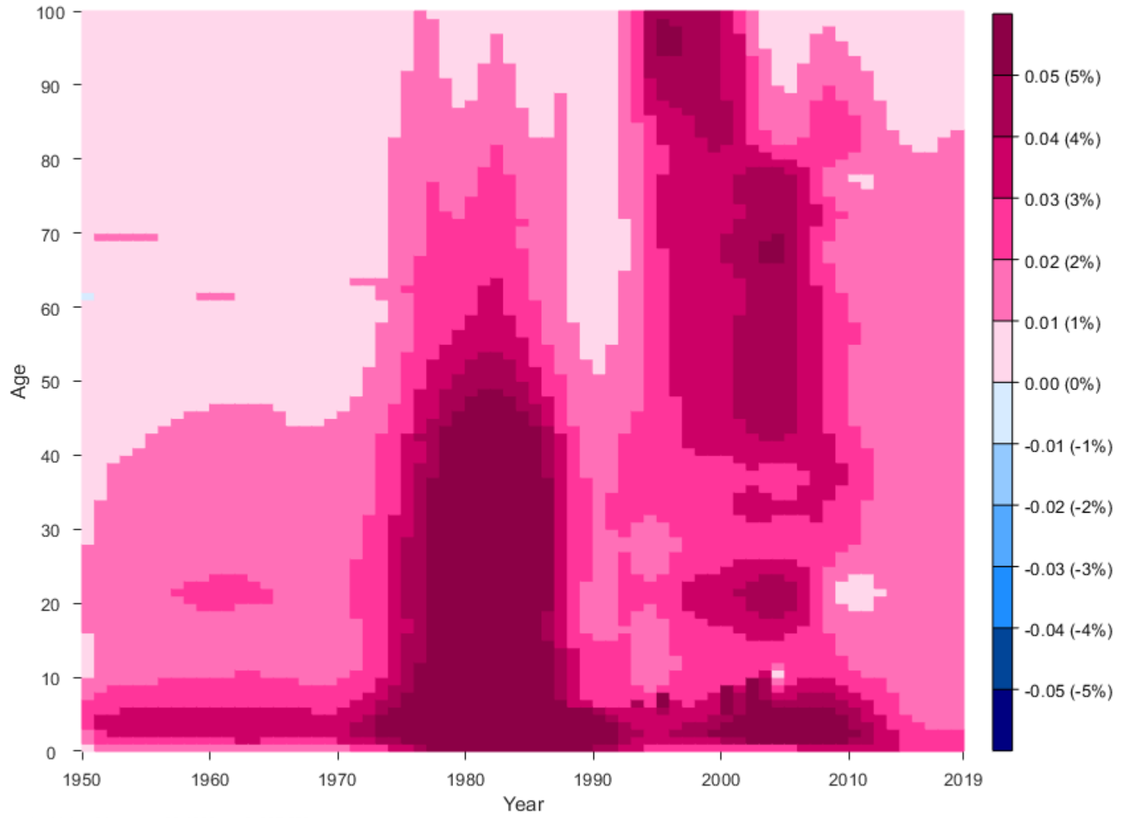
Females



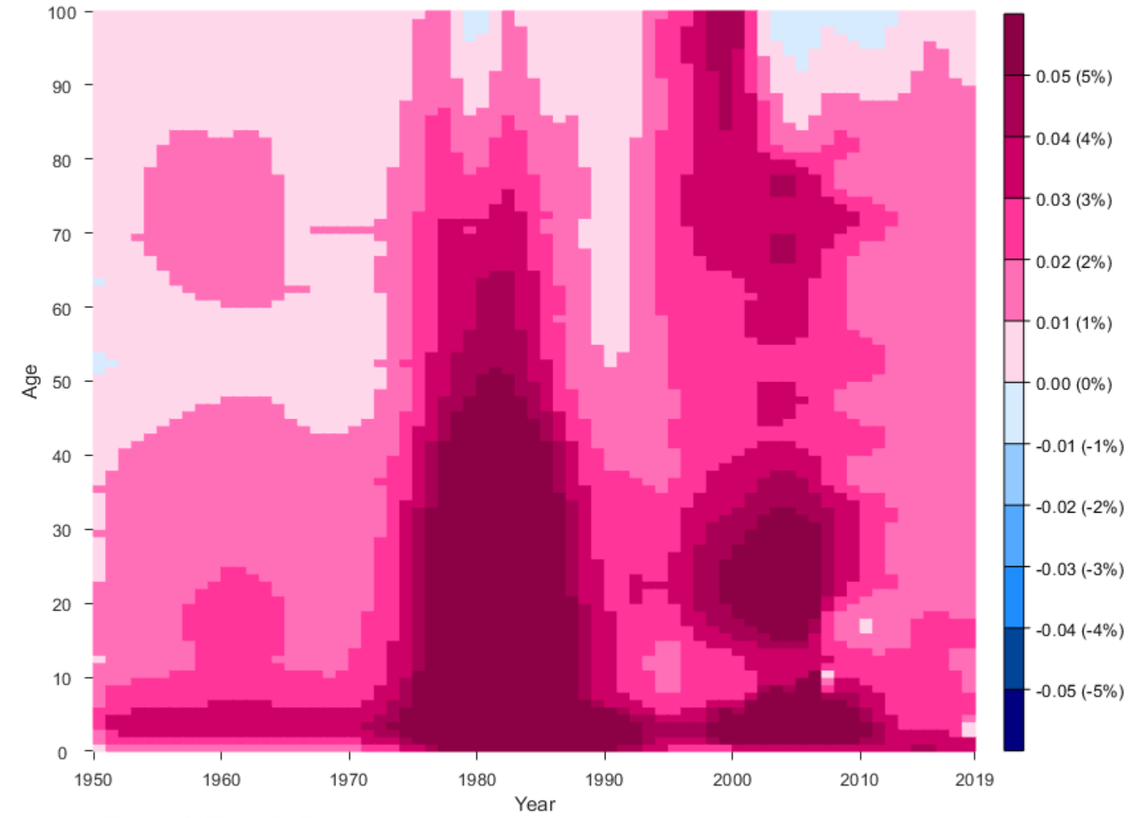
iters=18, nblobs=192, varprc=61.46, var0=1123.64

Algeria

Males

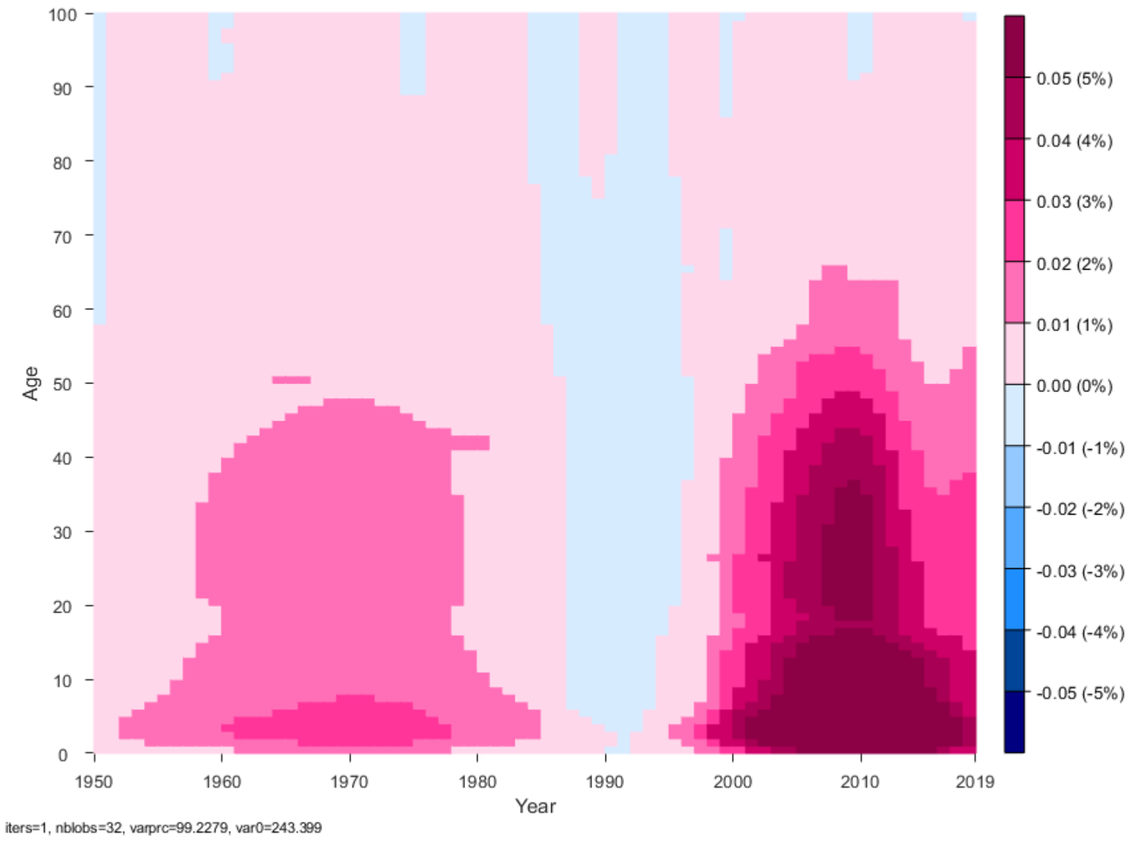


Females



Angola

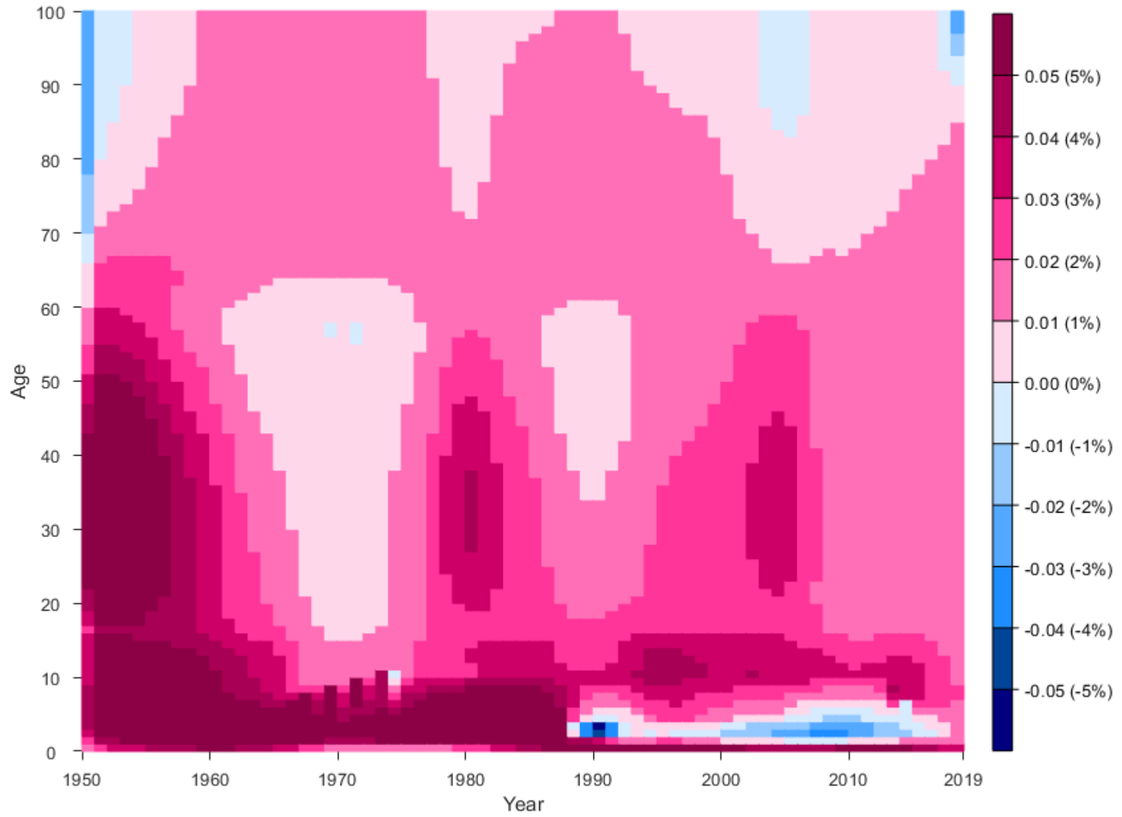
Males



Females

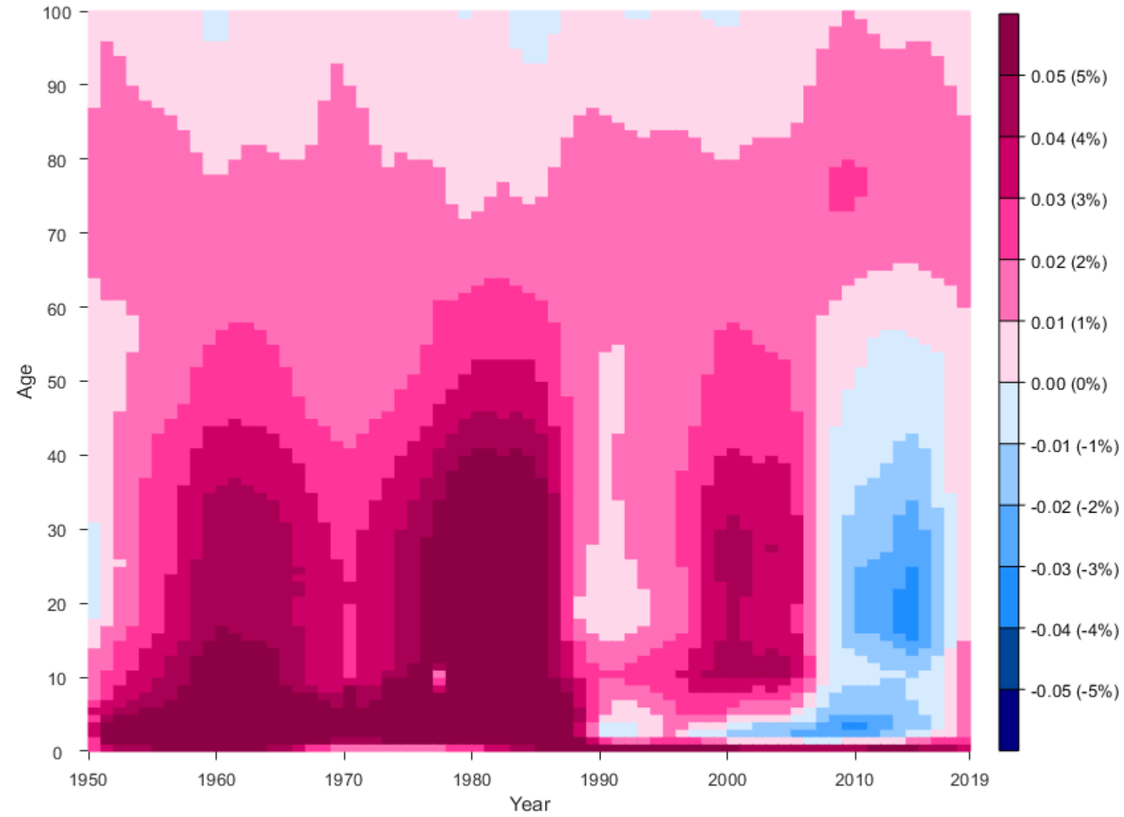
Antigua and Barbuda

Males



iters=1, nblobs=117, varprc=96.0446, var0=319.115

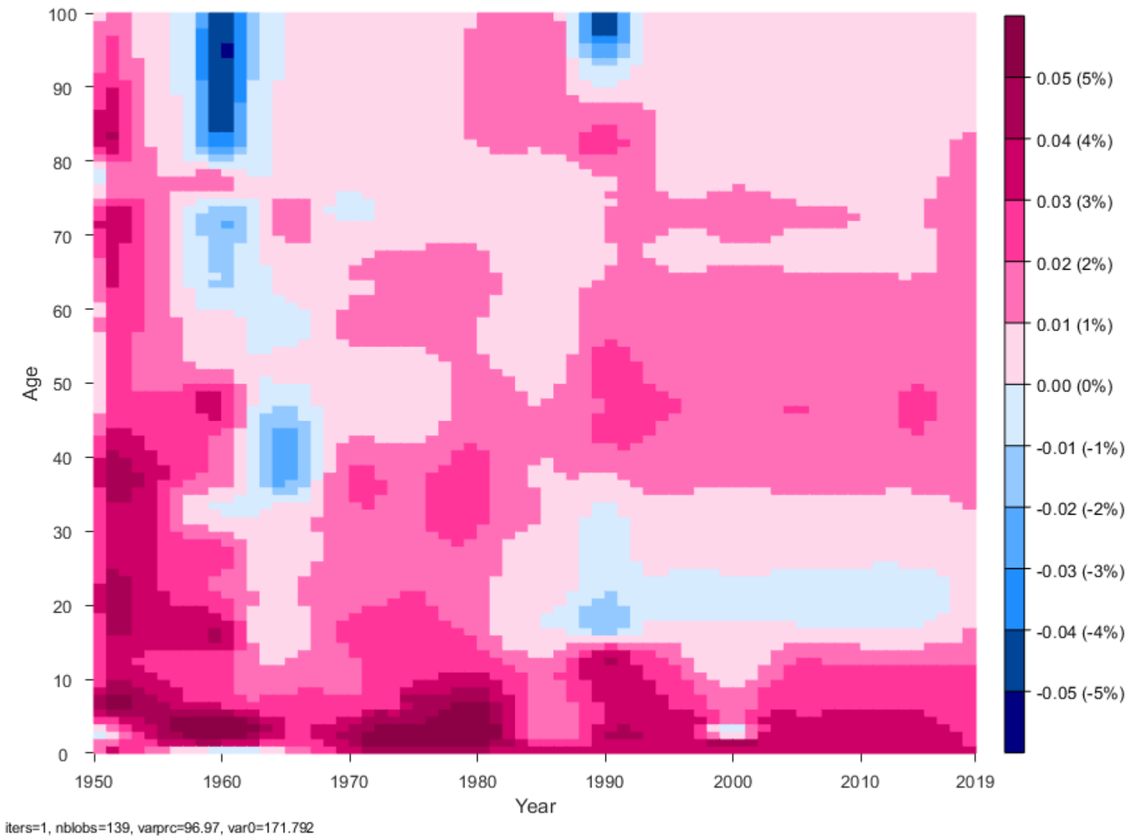
Females



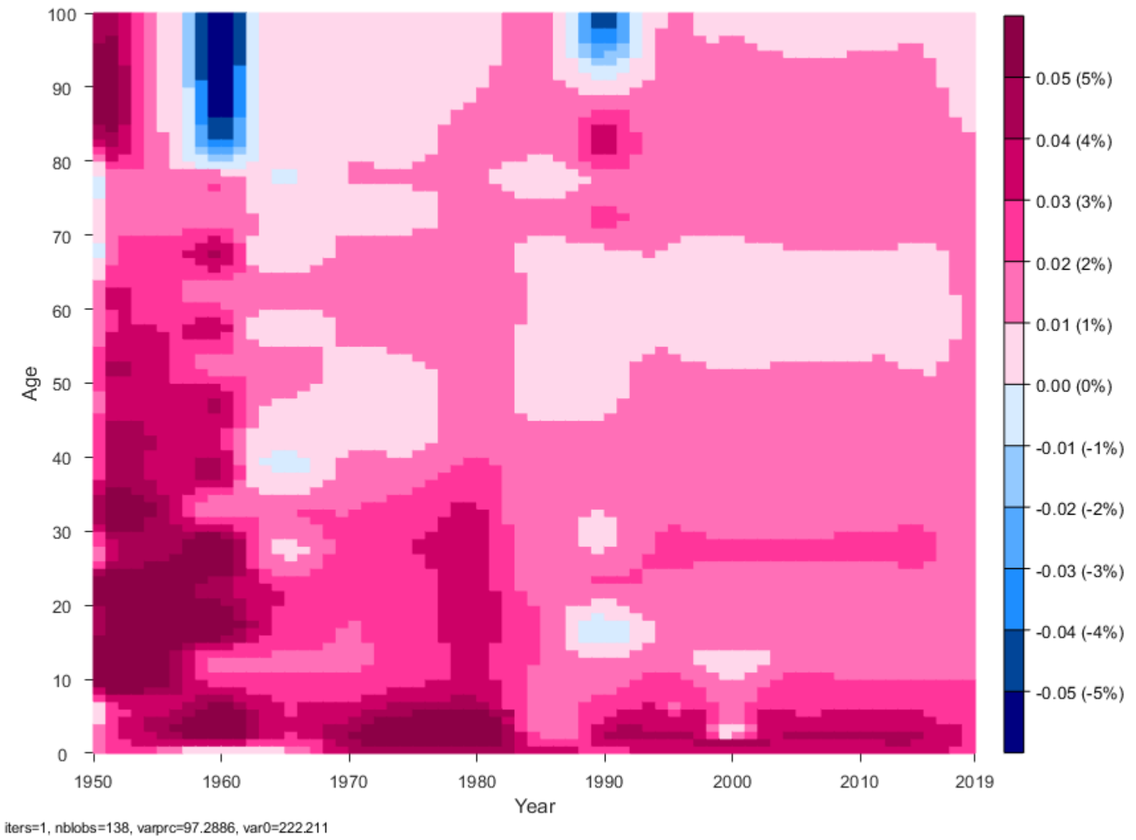
iters=1, nblobs=92, varprc=97.5161, var0=440.678

Argentina

Males

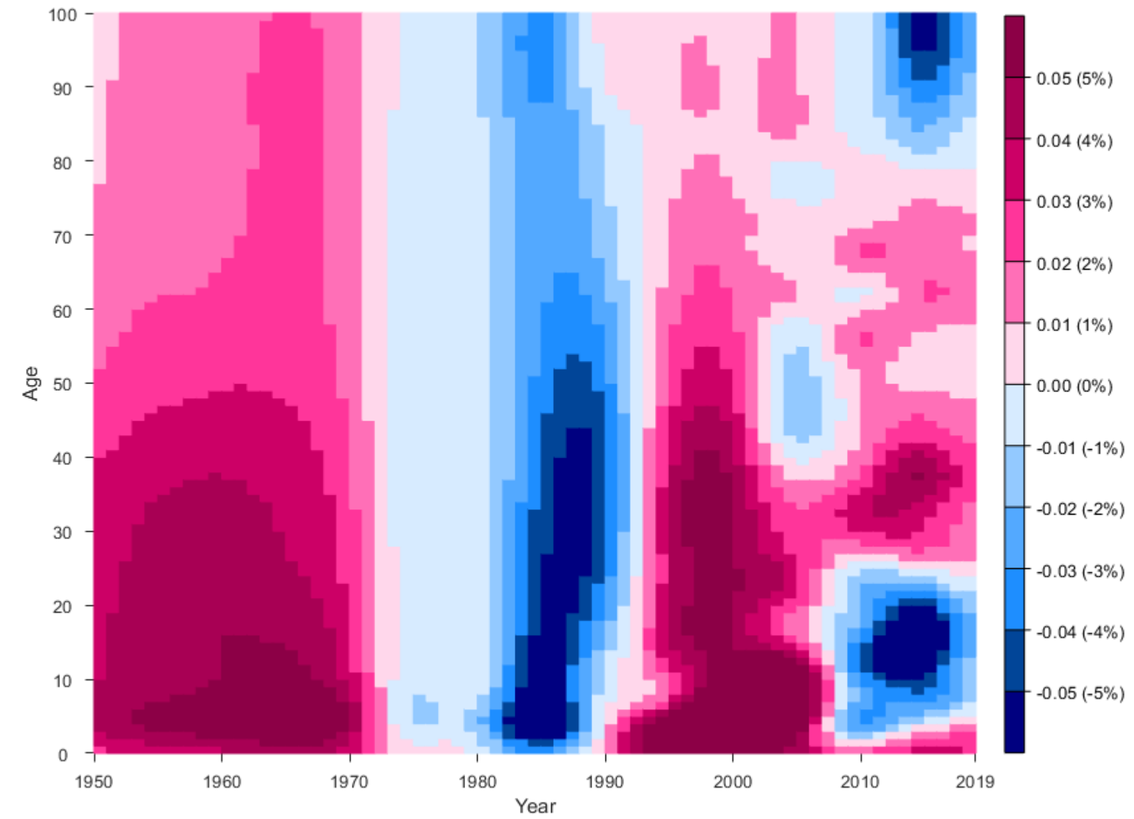


Females



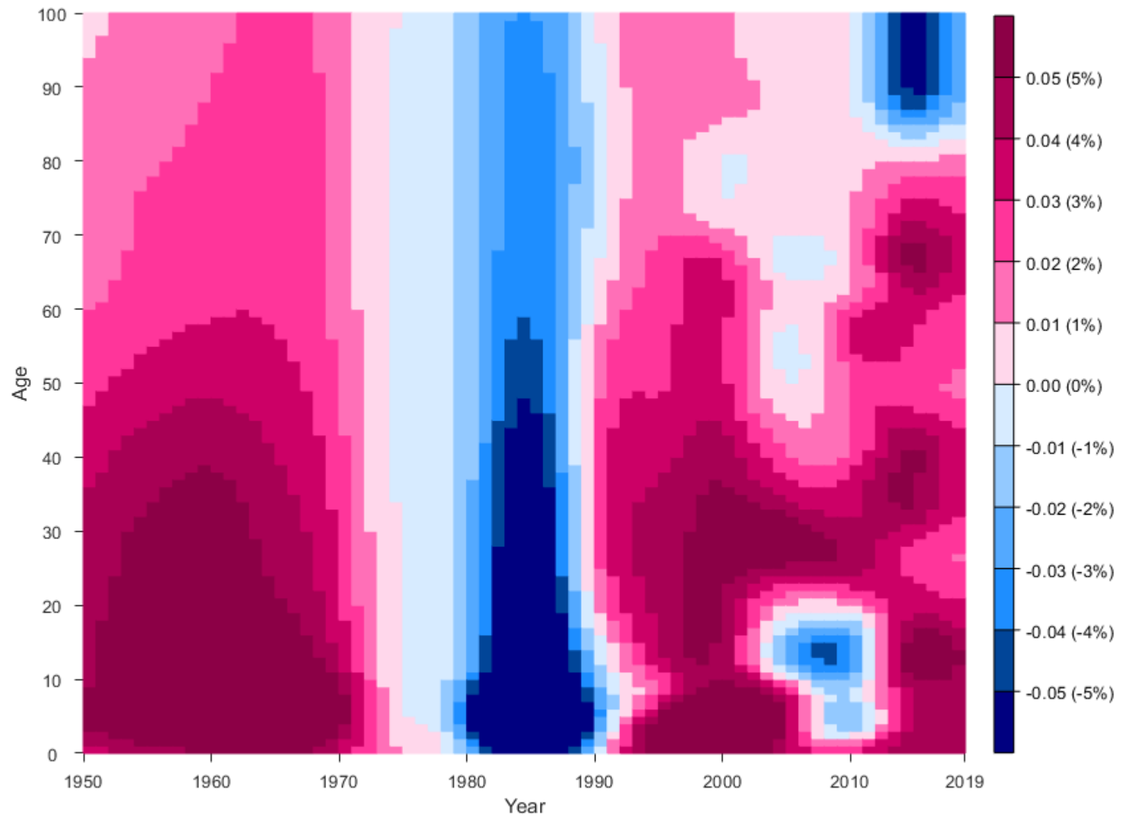
Armenia

Males



iters=19, nblobs=194, varprc=73.5523, var0=977.274

Females

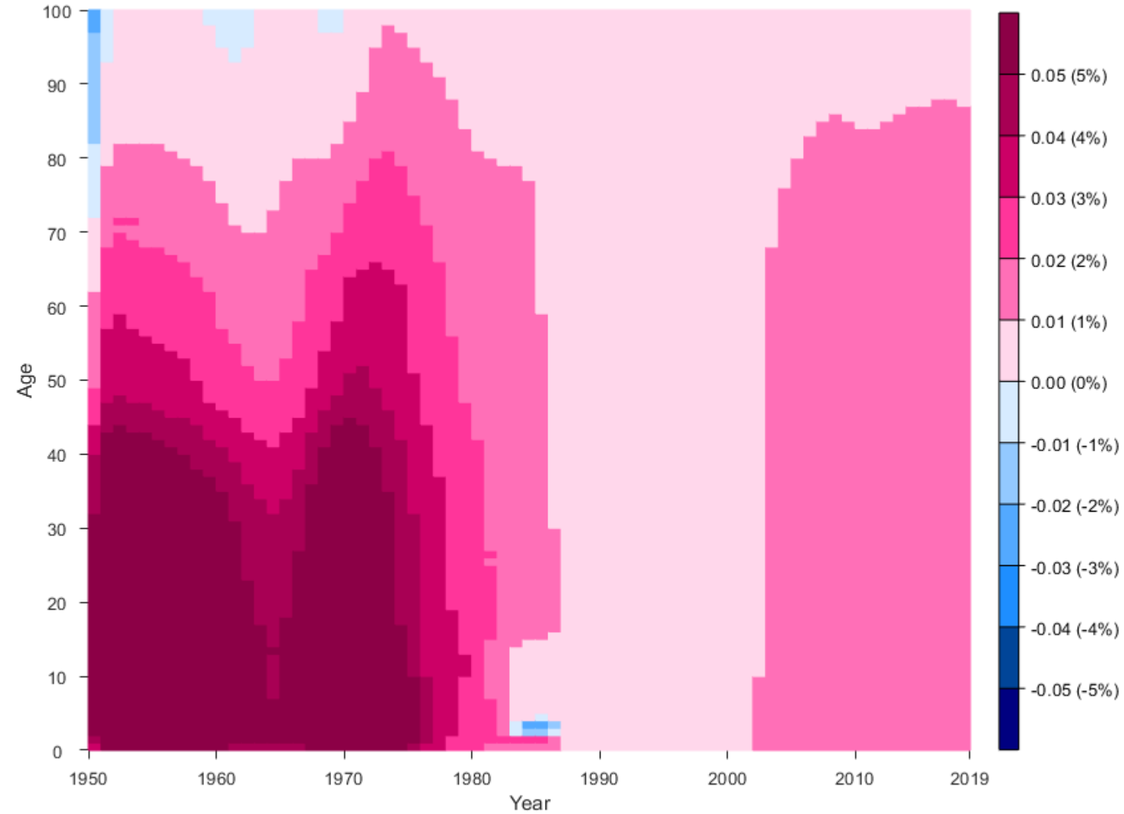


iters=22, nblobs=194, varprc=69.3852, var0=1462.72

Aruba

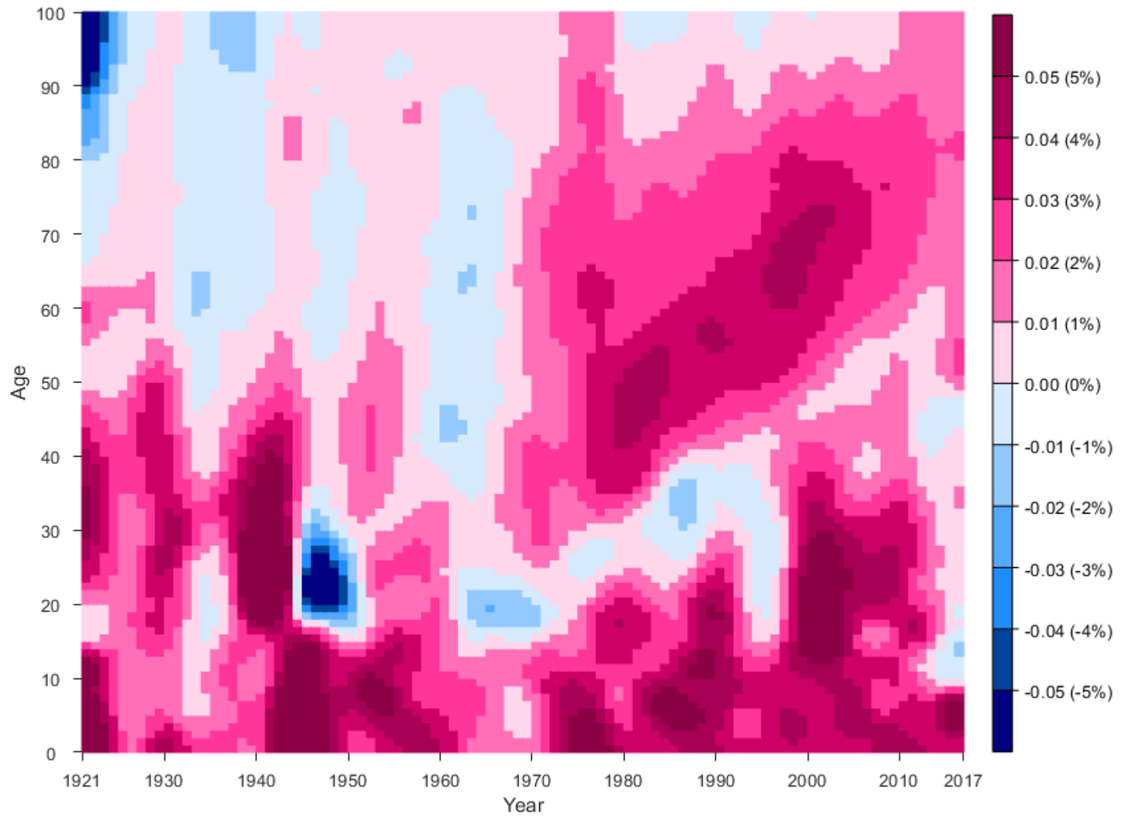
Males

Females



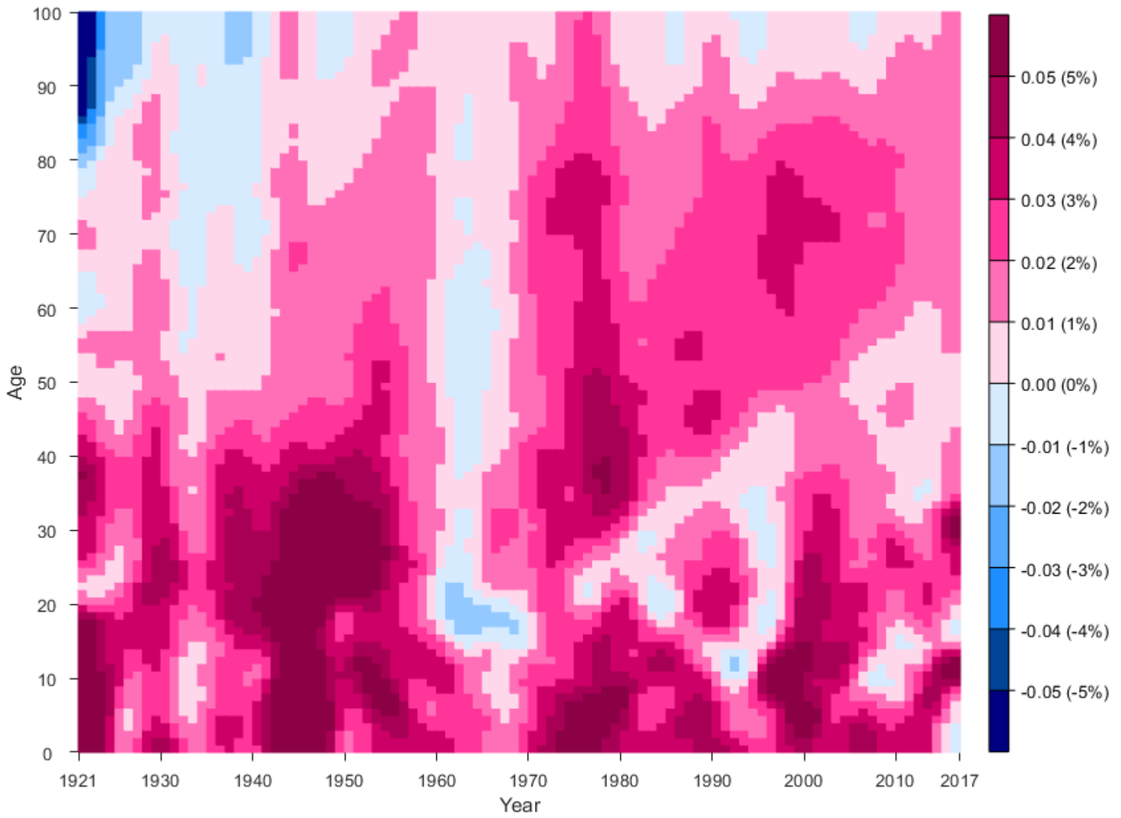
Australia

Males



iters=24, nblobs=248, varprc=2.25559, var0=15424.3

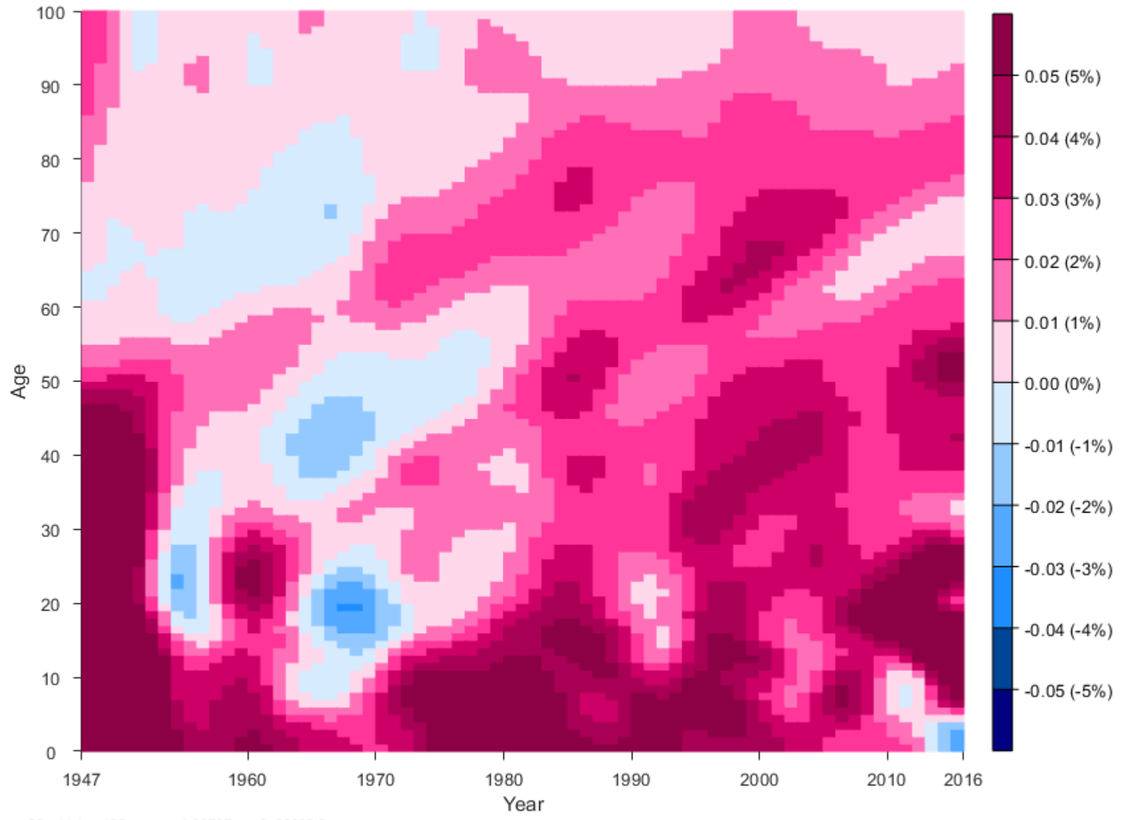
Females



iters=23, nblobs=252, varprc=1.20553, var0=24579.1

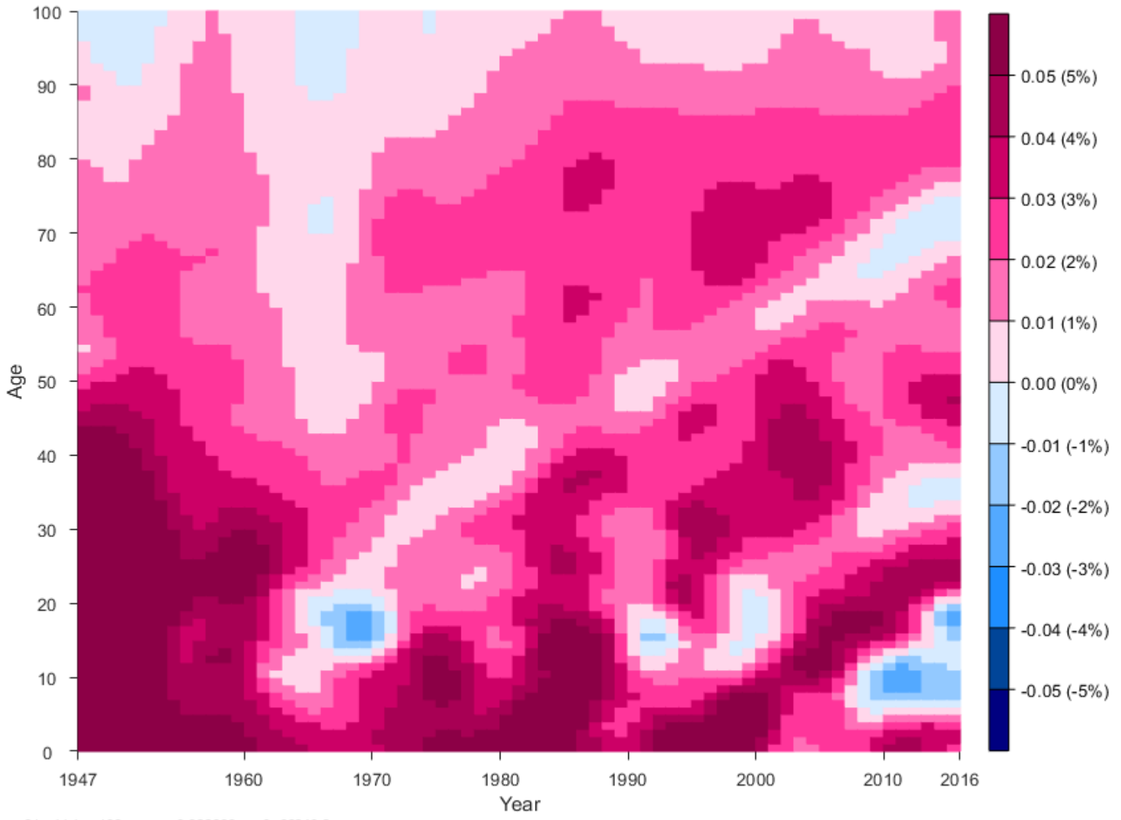
Austria

Males



iters=30, nblobs=187, varprc=1.36707, var0=36960.8

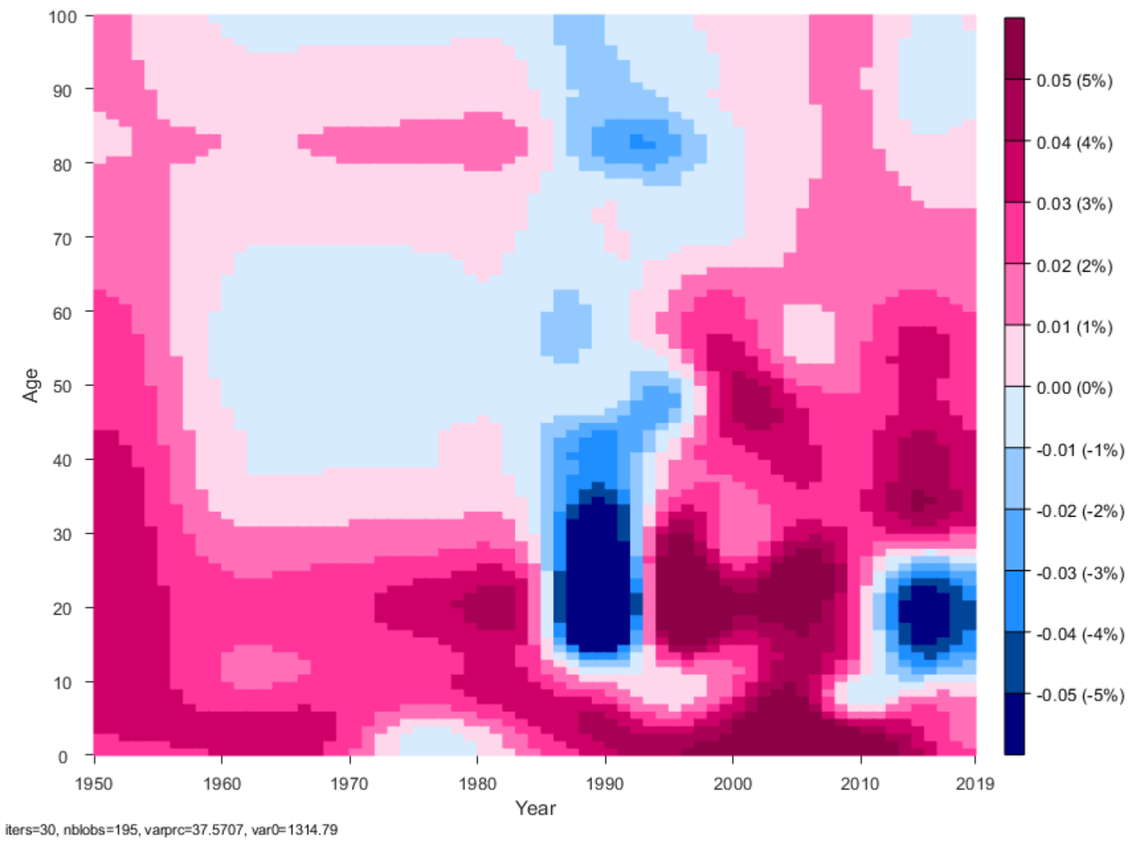
Females



iters=31, nblobs=193, varprc=0.922683, var0=62240.2

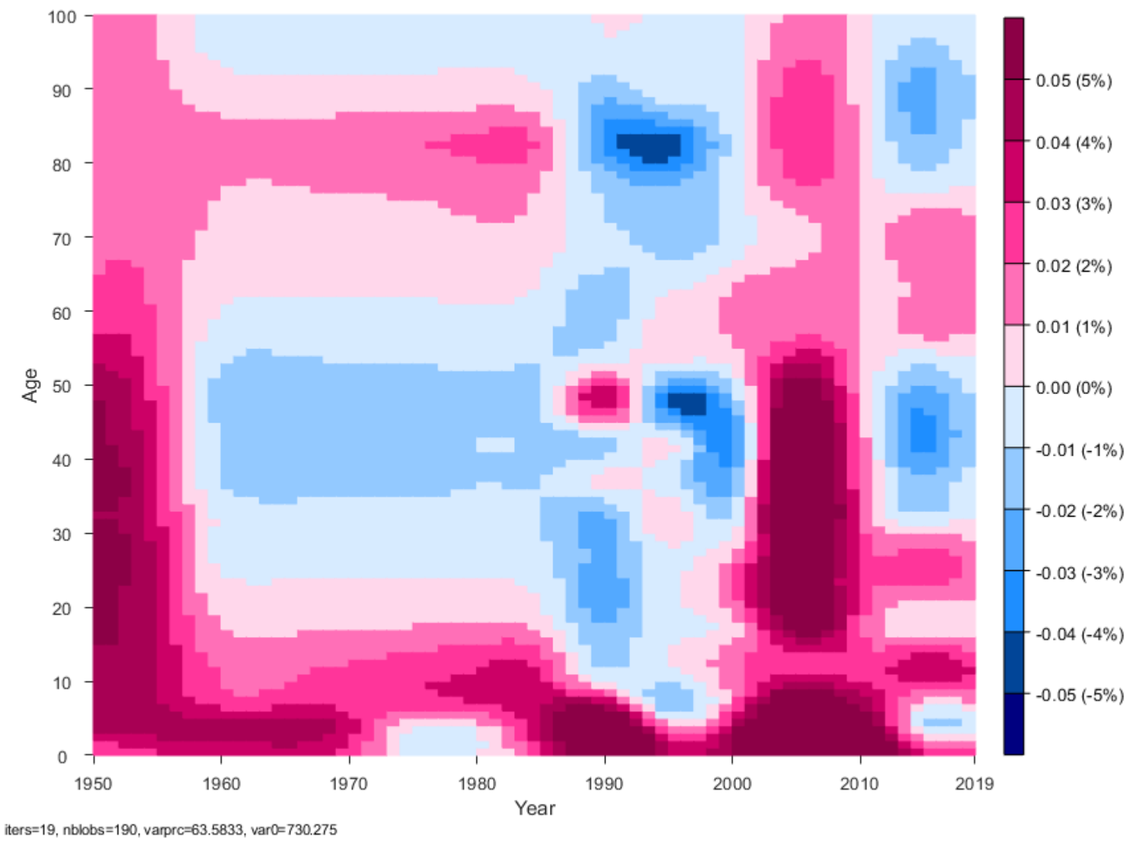
Azerbaijan

Males



iters=30, nblobs=195, varprc=37.5707, var0=1314.79

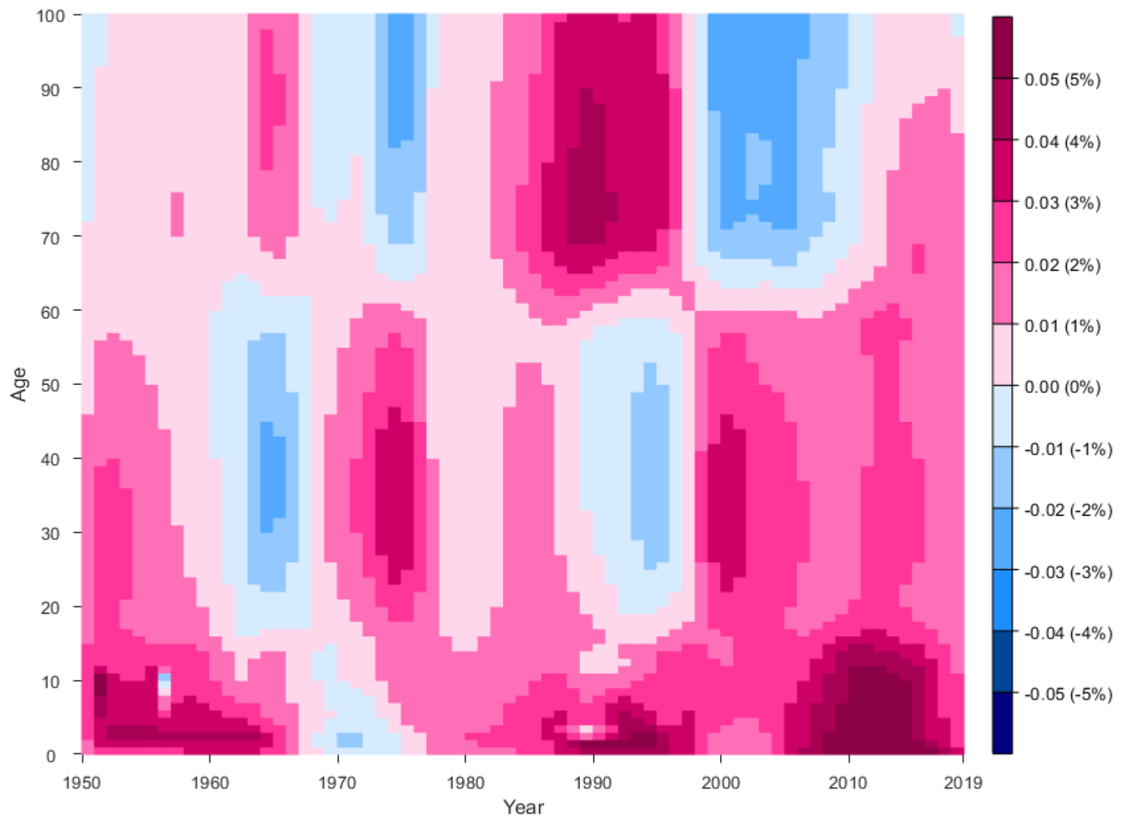
Females



iters=19, nblobs=190, varprc=63.5833, var0=730.275

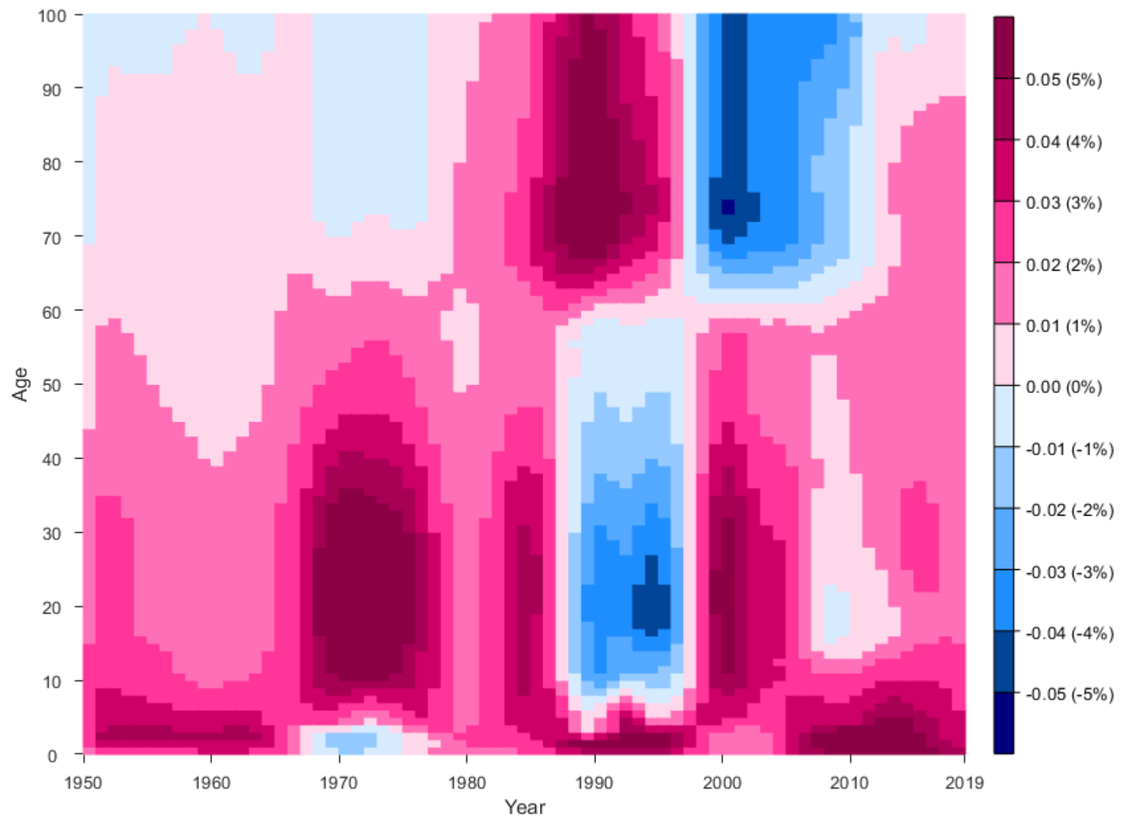
Bahamas

Males



iters=1, nblobs=76, varprc=97.7402, var0=234.634

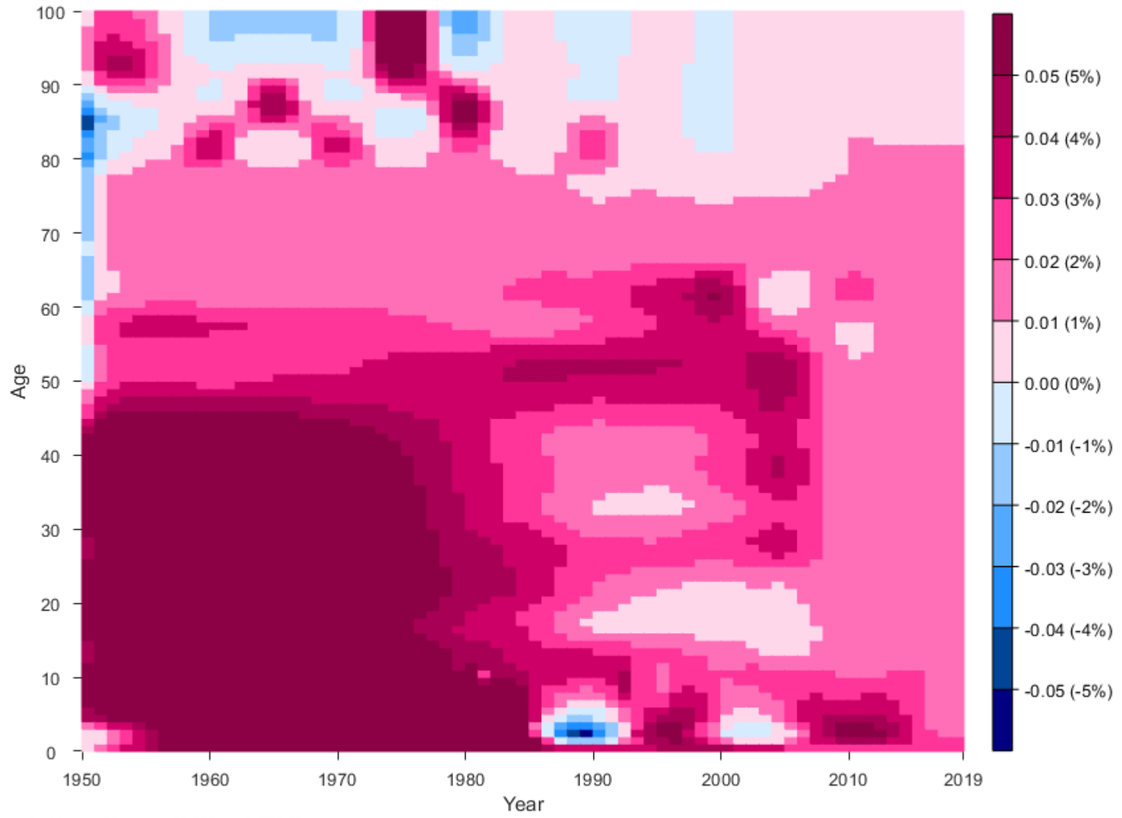
Females



iters=1, nblobs=112, varprc=98.2146, var0=453.328

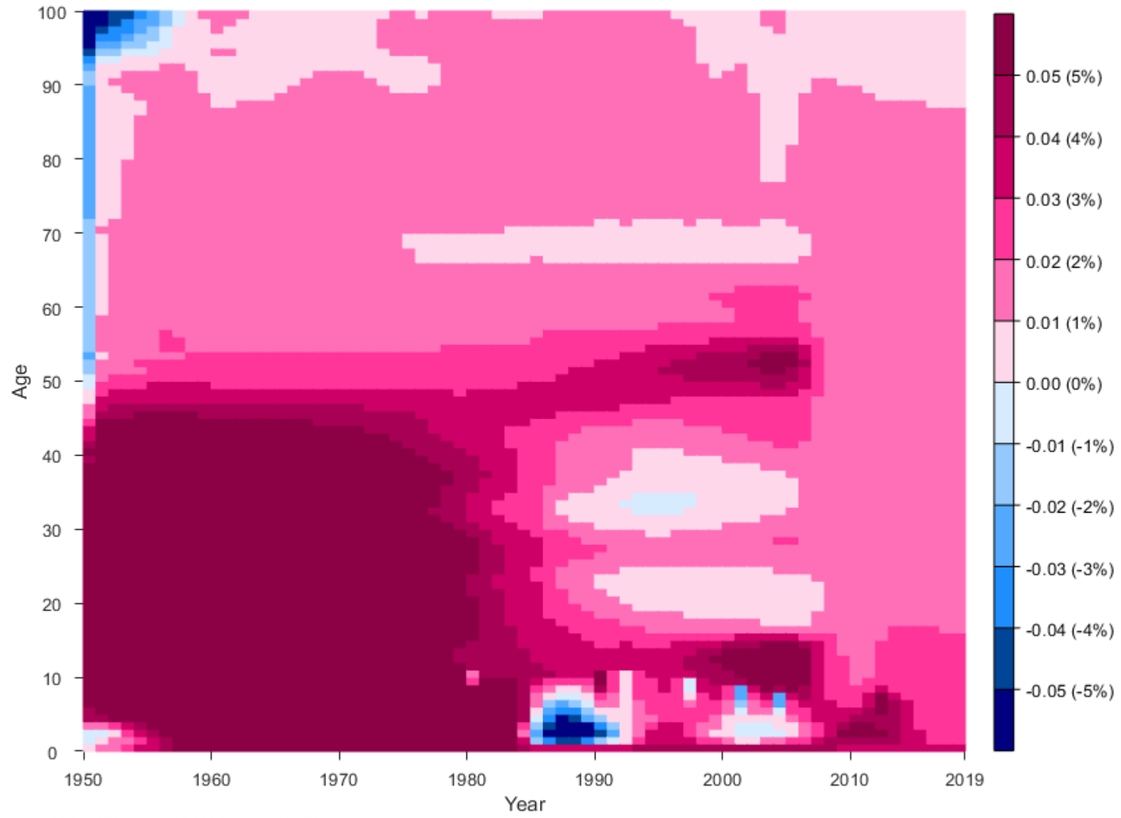
Bahrain

Males



iters=2, nblobs=196, varprc=96.399, var0=776.391

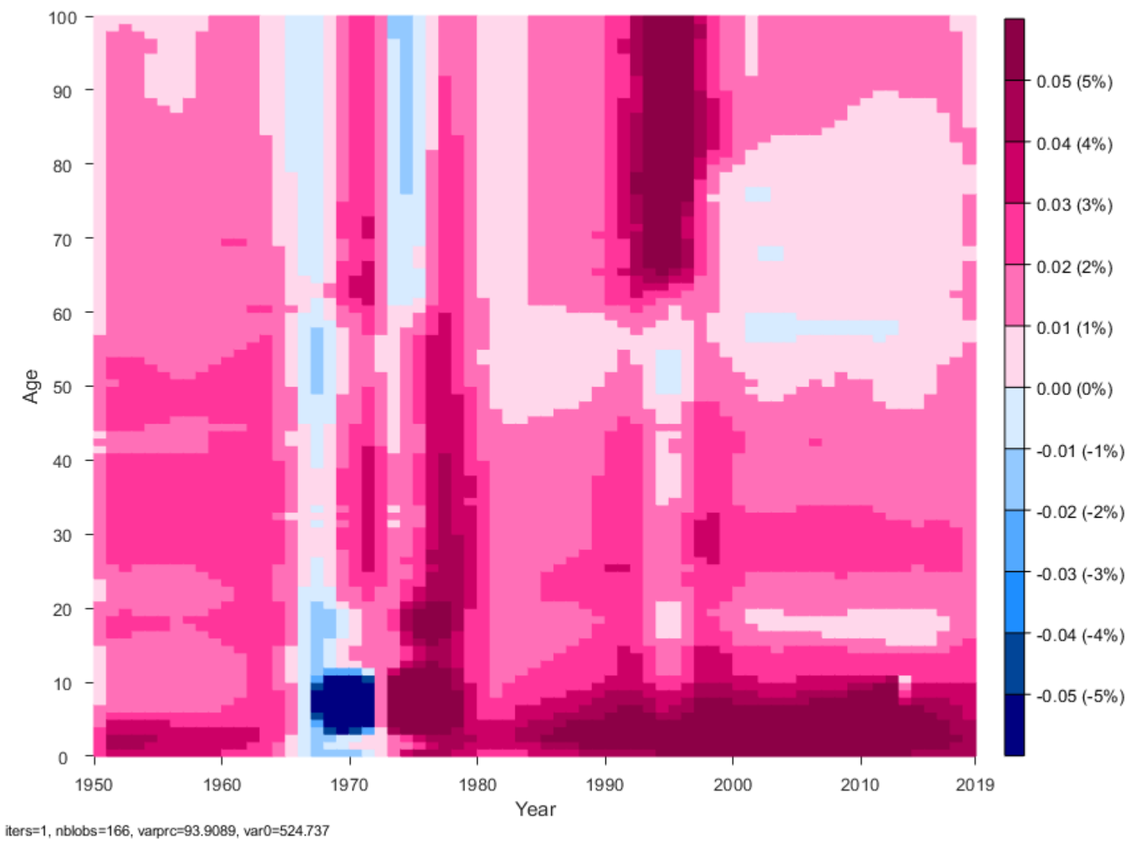
Females



iters=1, nblobs=172, varprc=97.9882, var0=1021.79

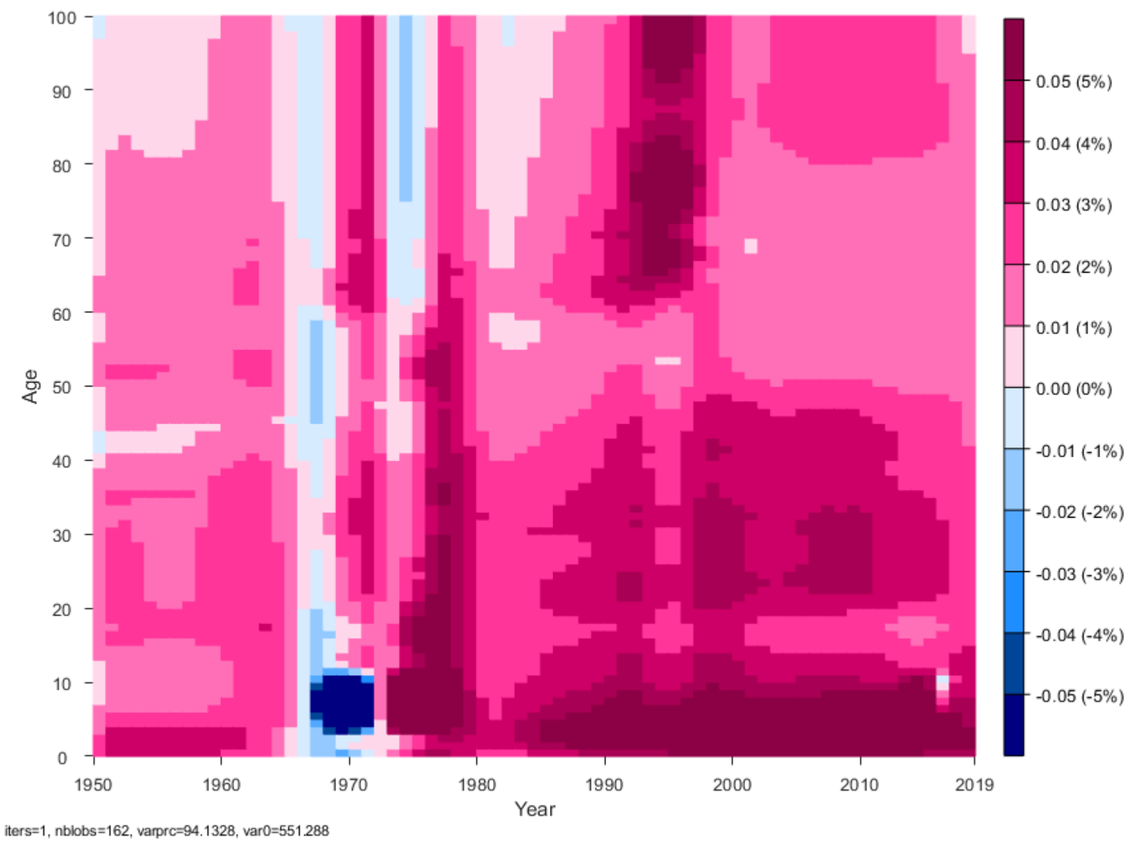
Bangladesh

Males



iters=1, nblobs=166, varprc=93.9089, var0=524.737

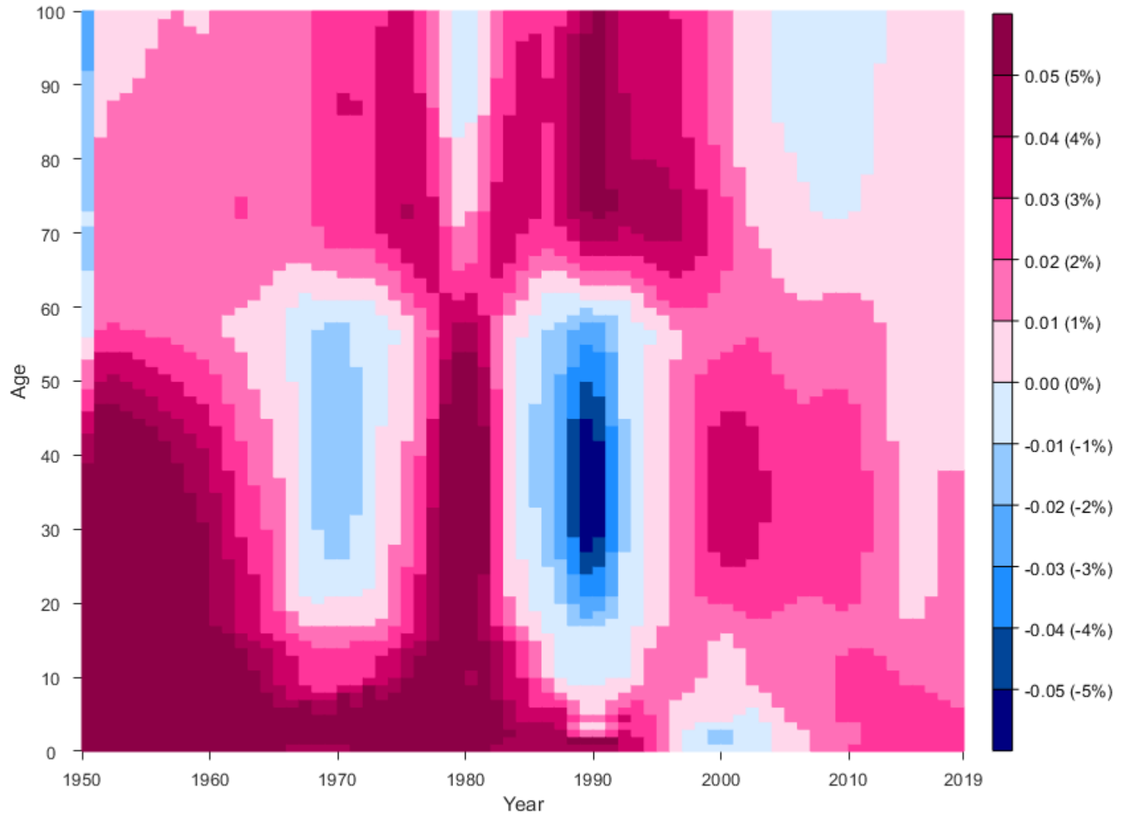
Females



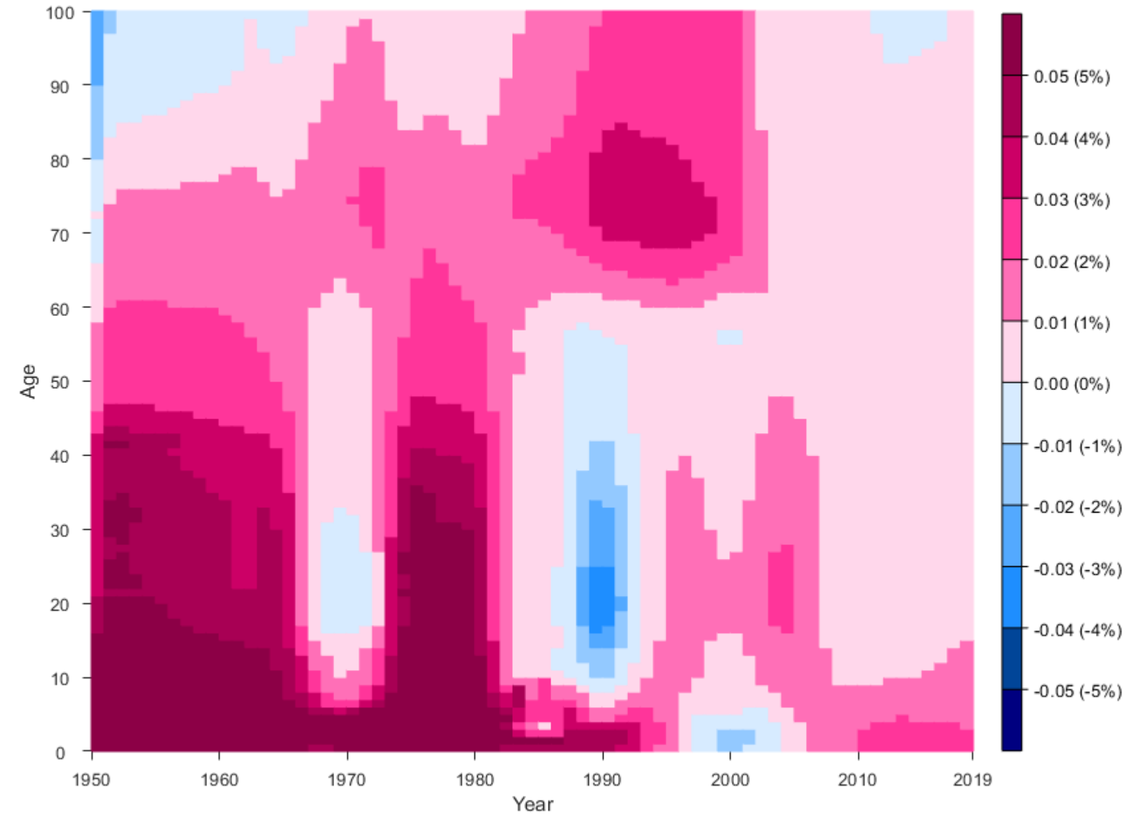
iters=1, nblobs=162, varprc=94.1328, var0=551.288

Barbados

Males

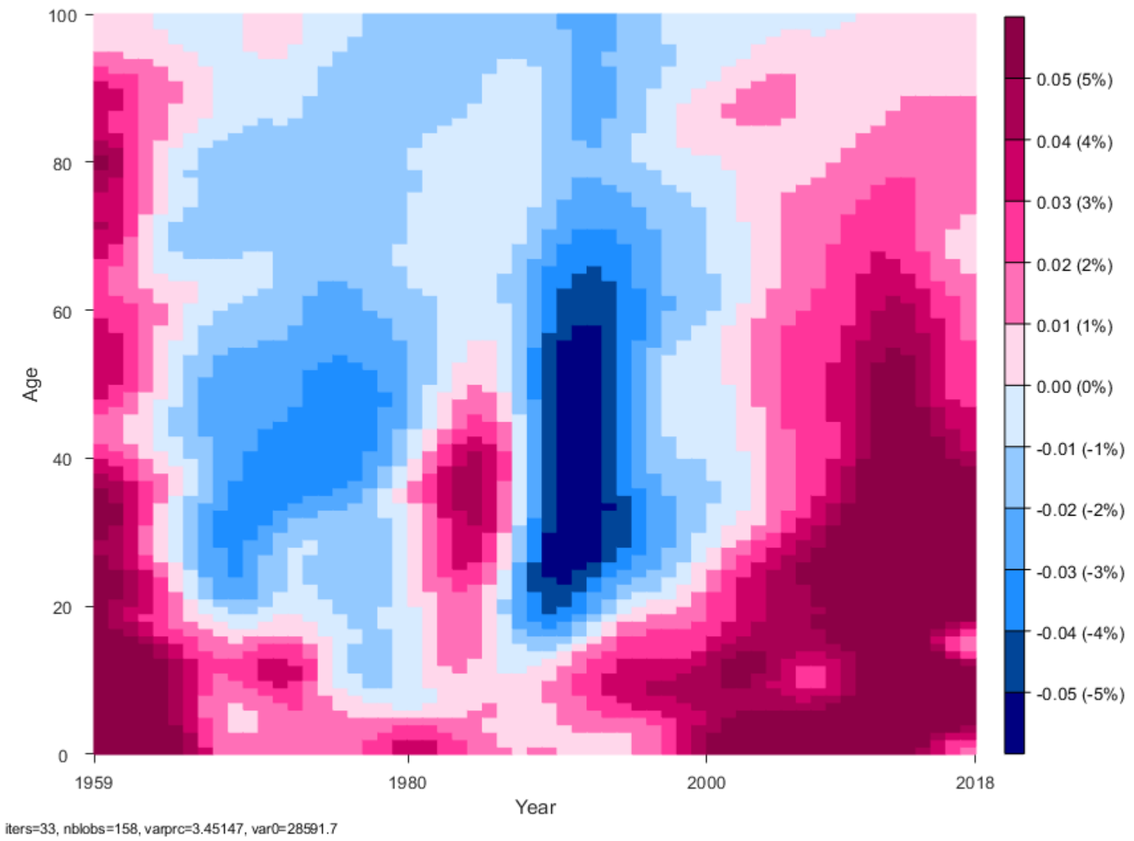


Females



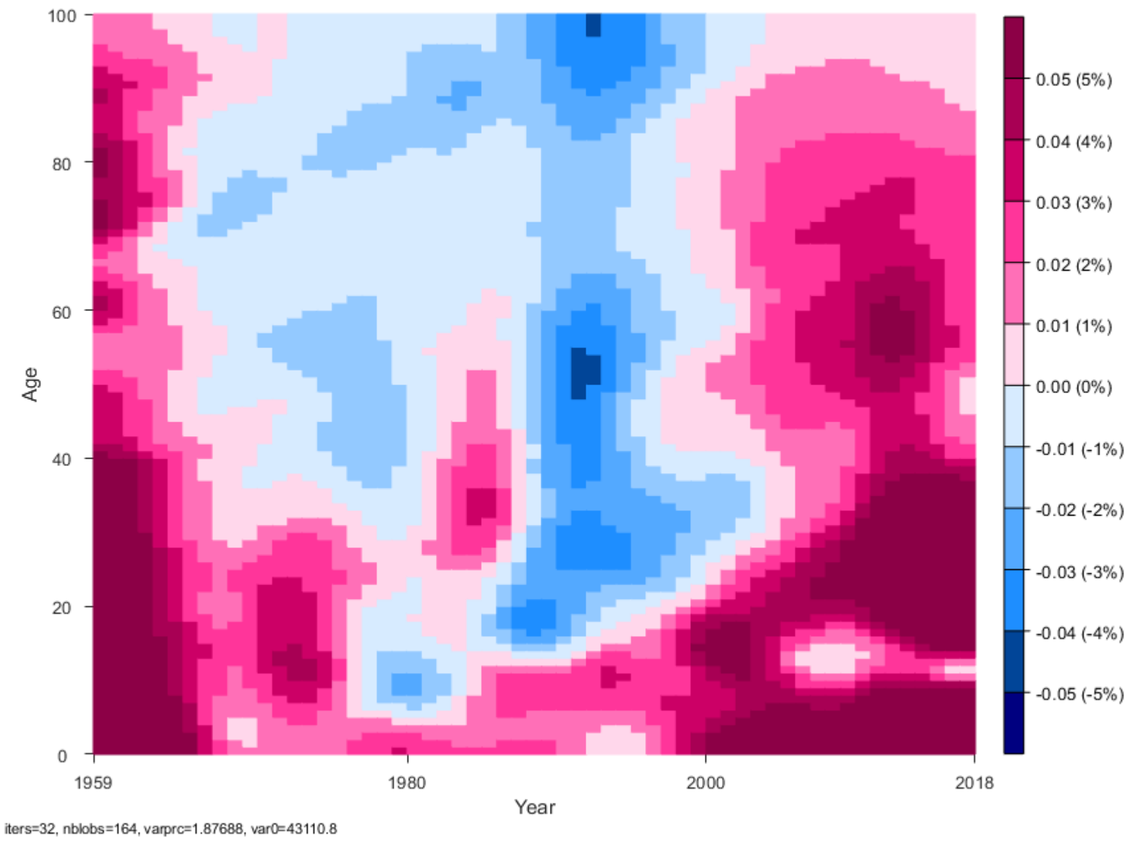
Belarus

Males



iters=33, nblobs=158, varprc=3.45147, var0=28591.7

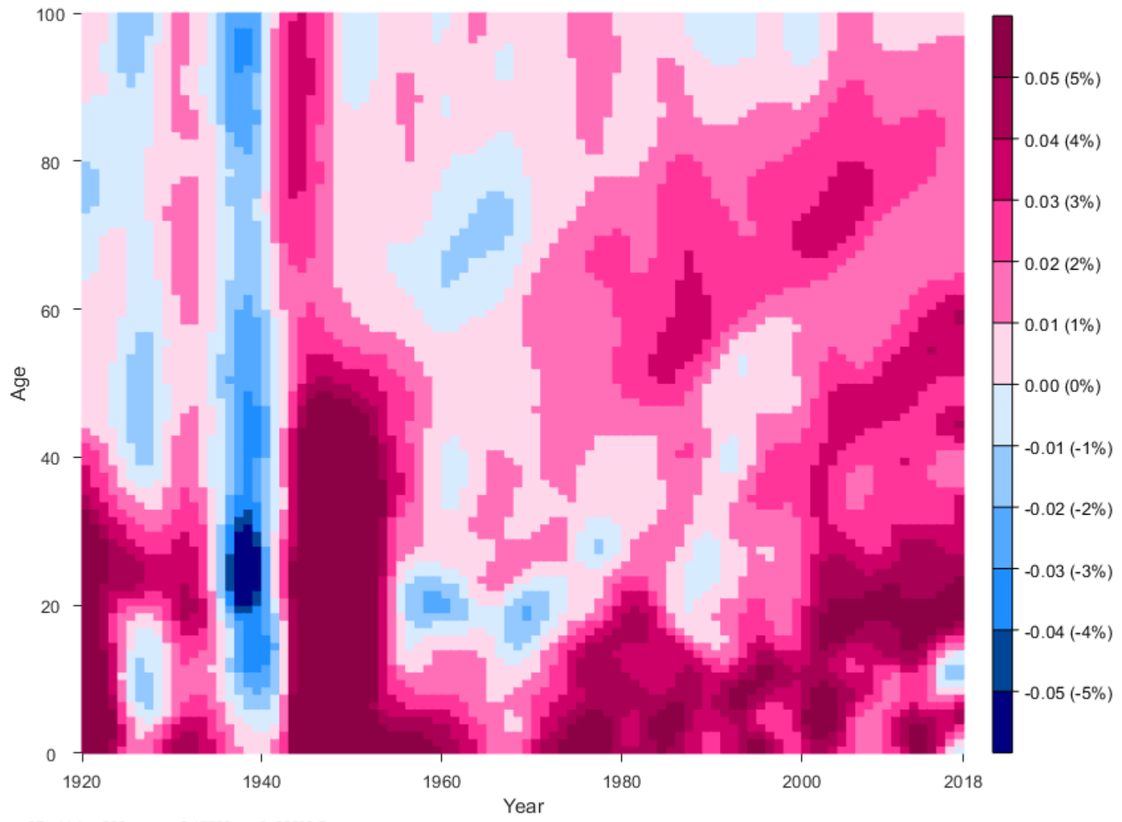
Females



iters=32, nblobs=164, varprc=1.87688, var0=43110.8

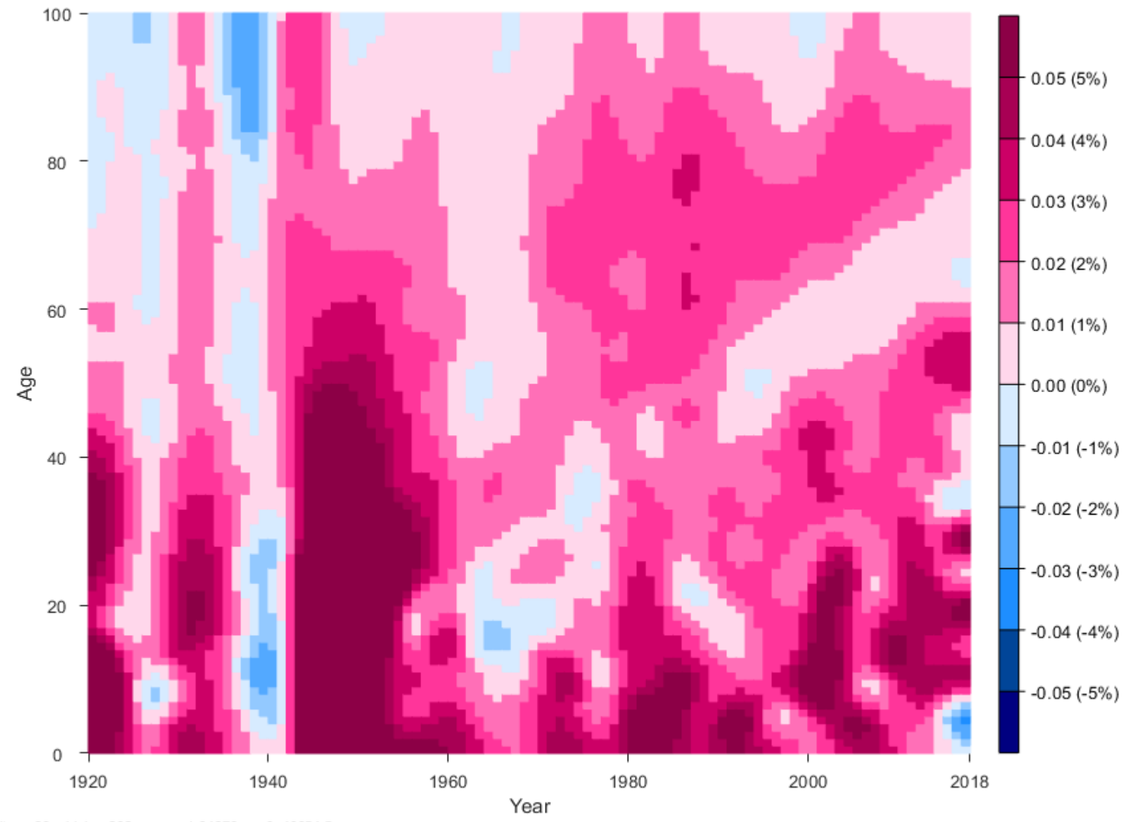
Belgium

Males



iters=27, nblobs=266, varprc=2.17799, var0=32623.7

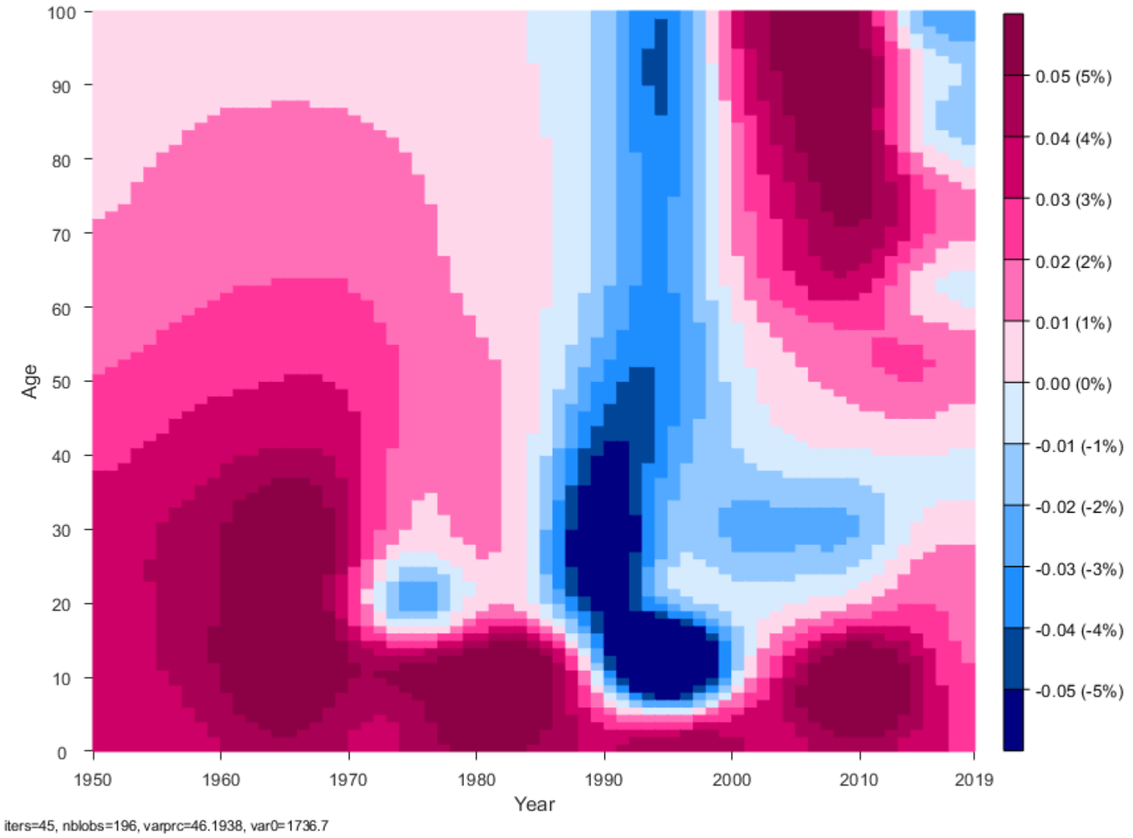
Females



iters=28, nblobs=262, varprc=1.64273, var0=40854.5

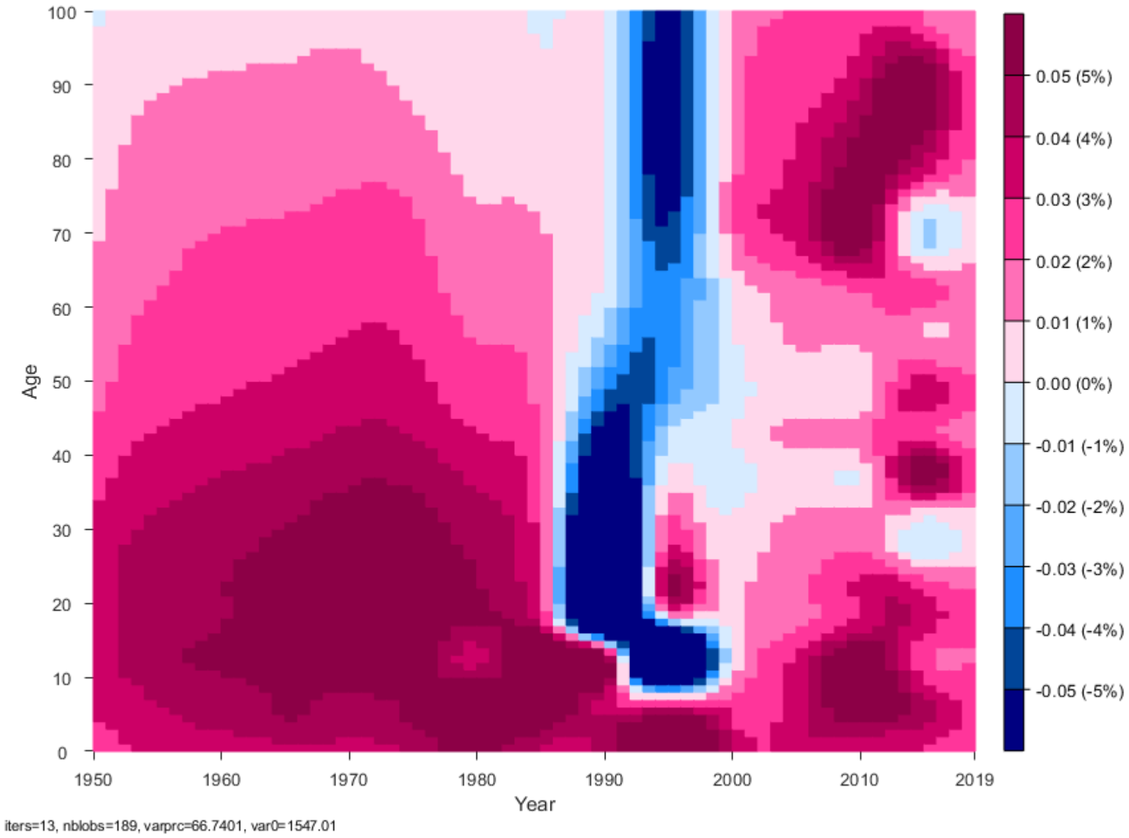
Belize

Males



iters=45, nblobs=196, varprc=46.1938, var0=1736.7

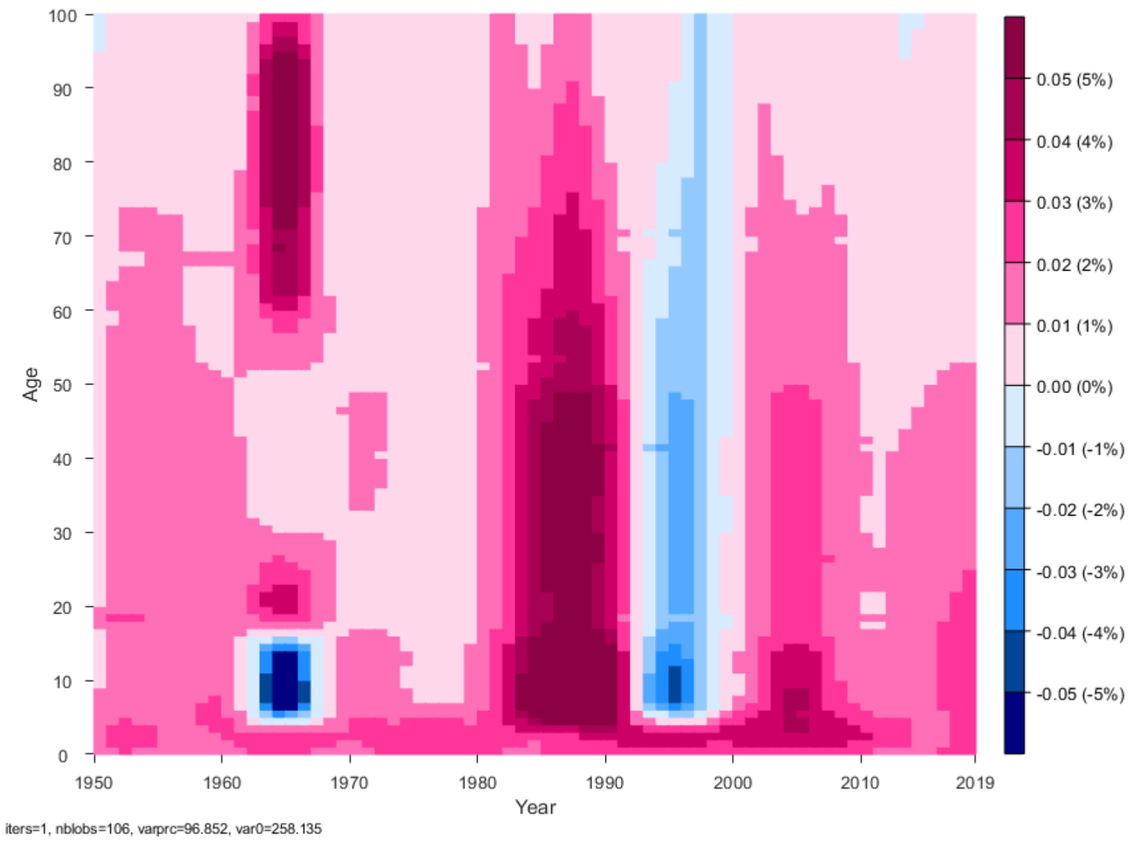
Females



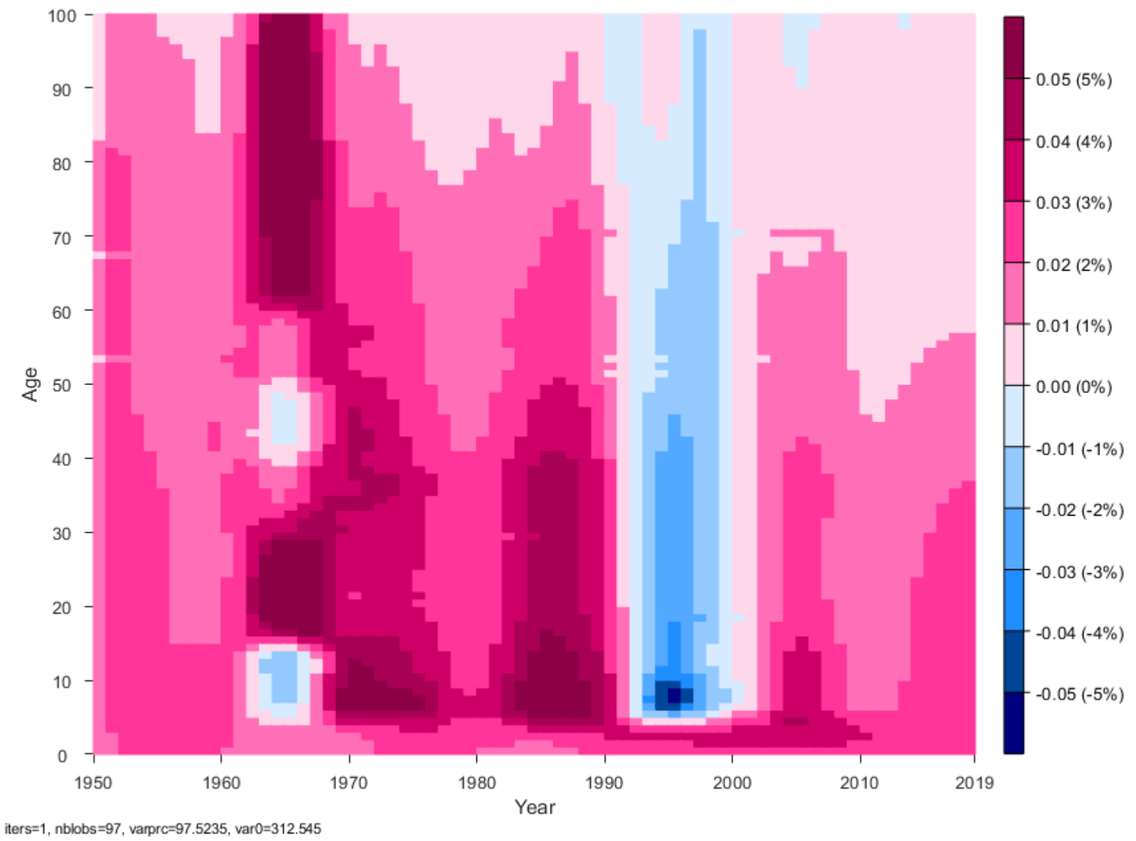
iters=13, nblobs=189, varprc=66.7401, var0=1547.01

Benin

Males

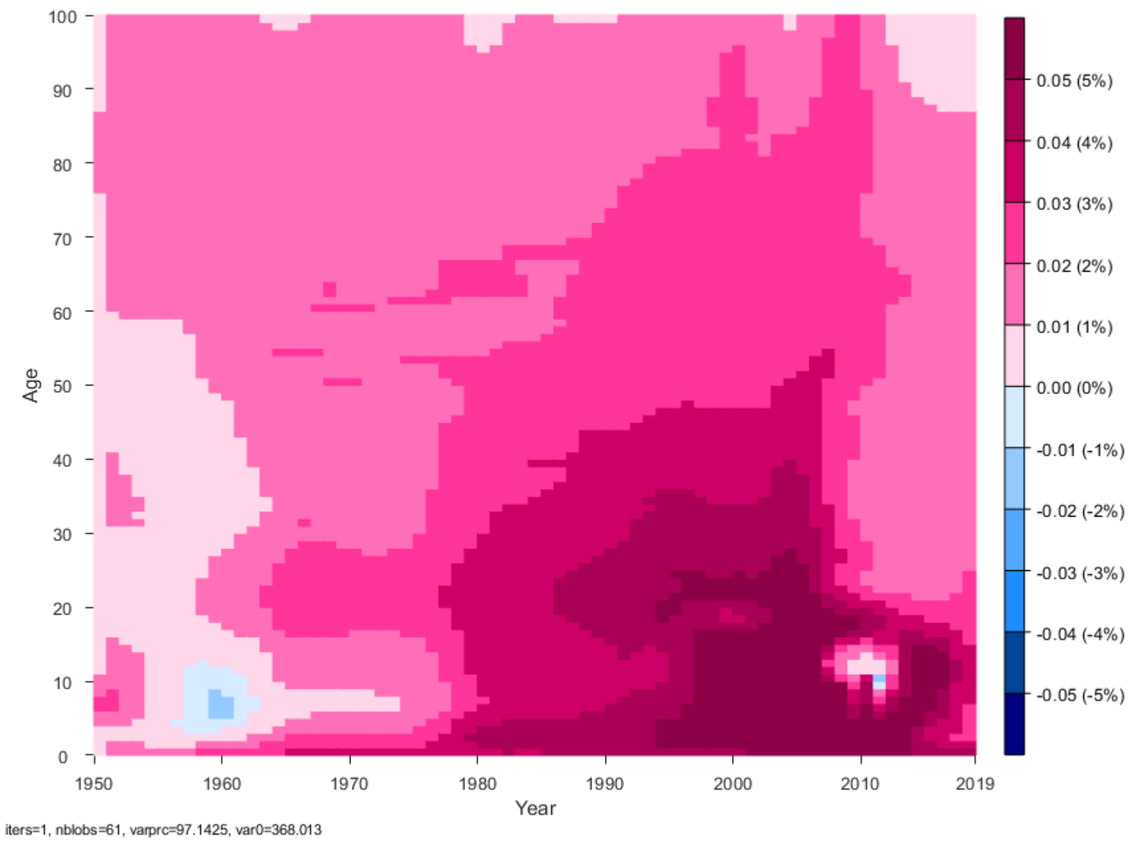


Females



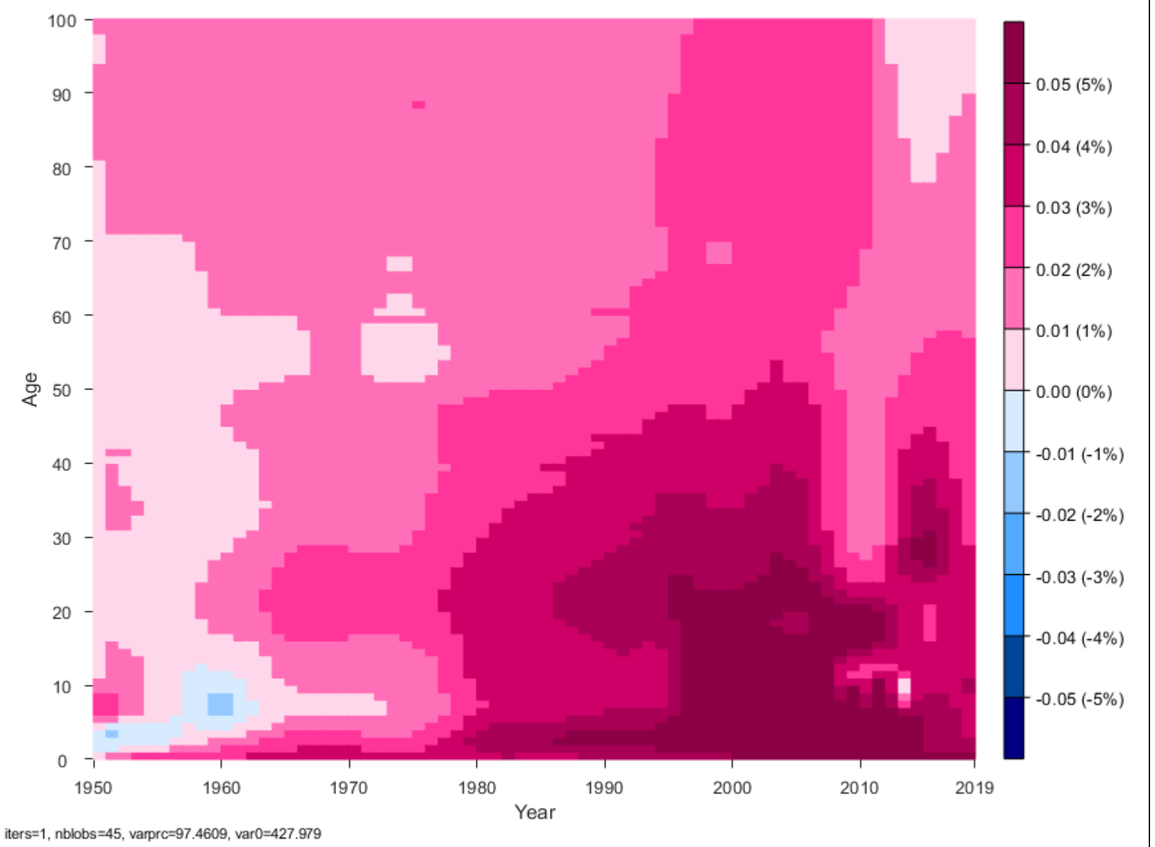
Bhutan

Males



iters=1, nblobs=61, varprc=97.1425, var0=368.013

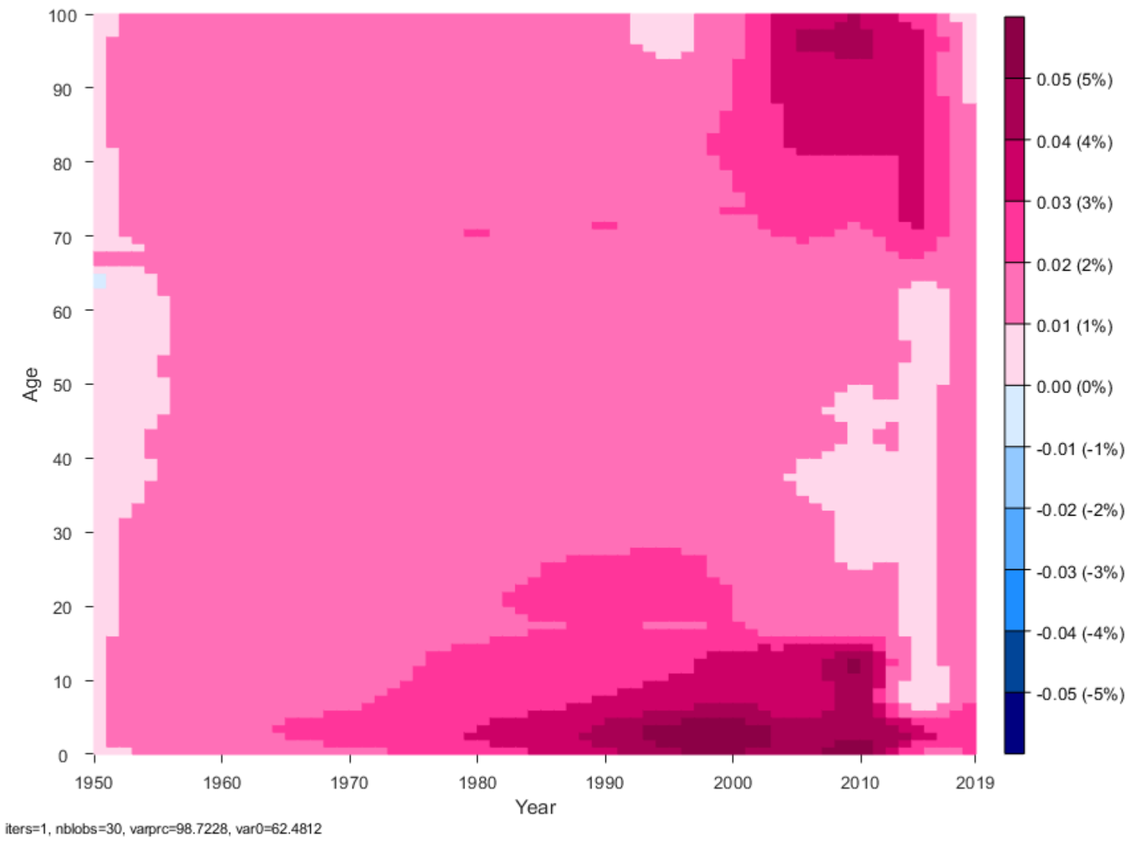
Females



iters=1, nblobs=45, varprc=97.4609, var0=427.979

Bolivia (Plurinational State of)

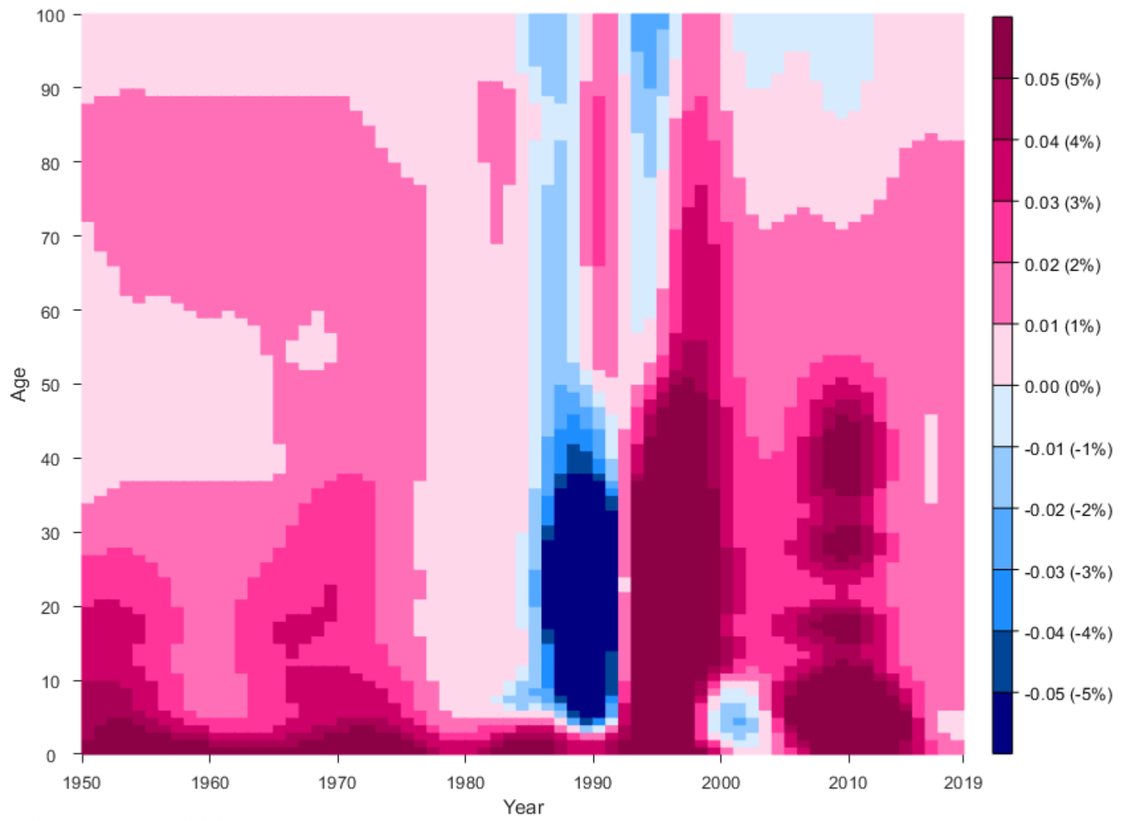
Males



Females

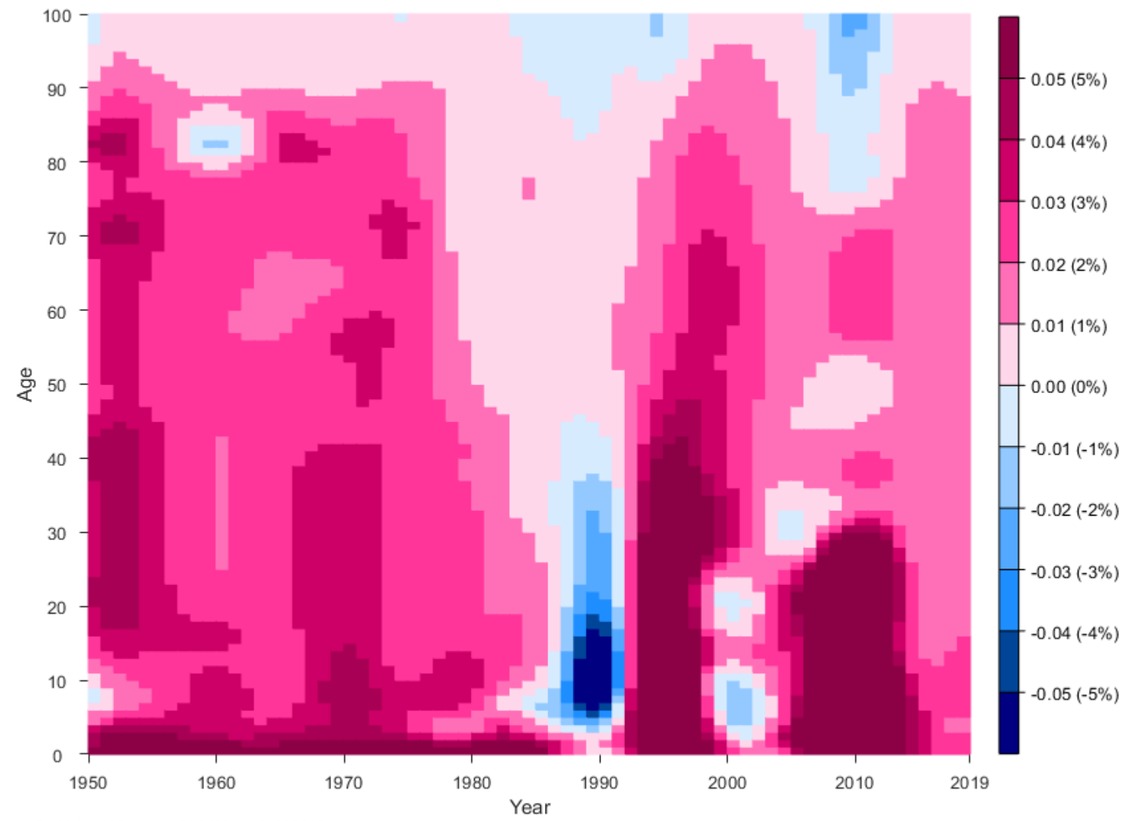
Bosnia and Herzegovina

Males



iters=10, nblobs=194, varprc=63.2505, var0=2363.11

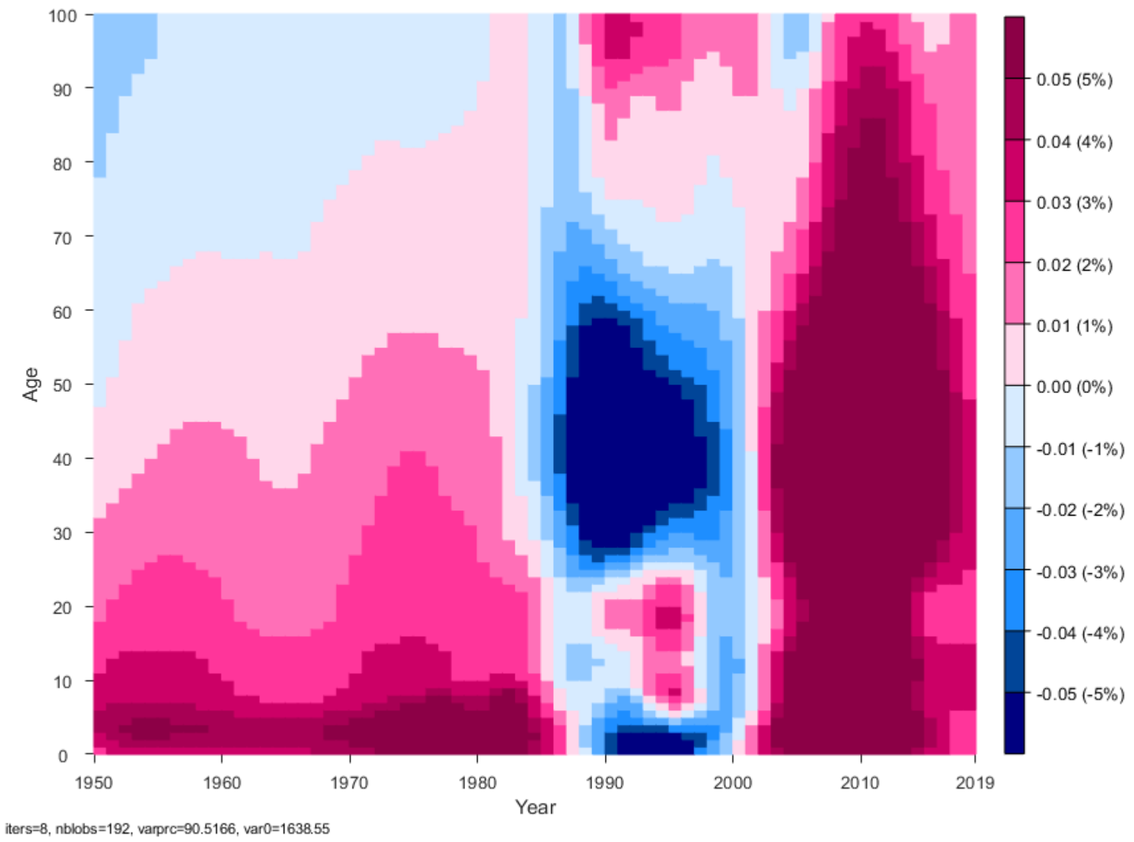
Females



iters=7, nblobs=195, varprc=74.8493, var0=987.946

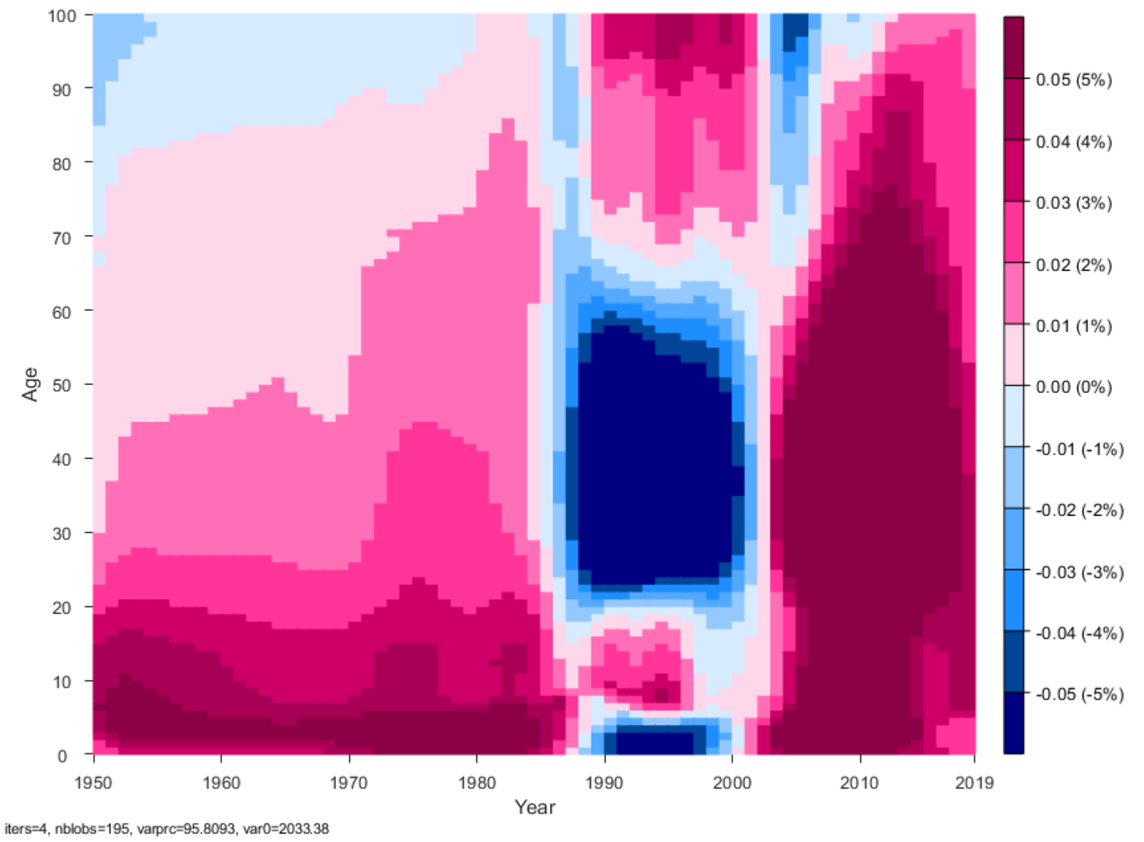
Botswana

Males



iters=8, nblobs=192, varprc=90.5166, var0=1638.55

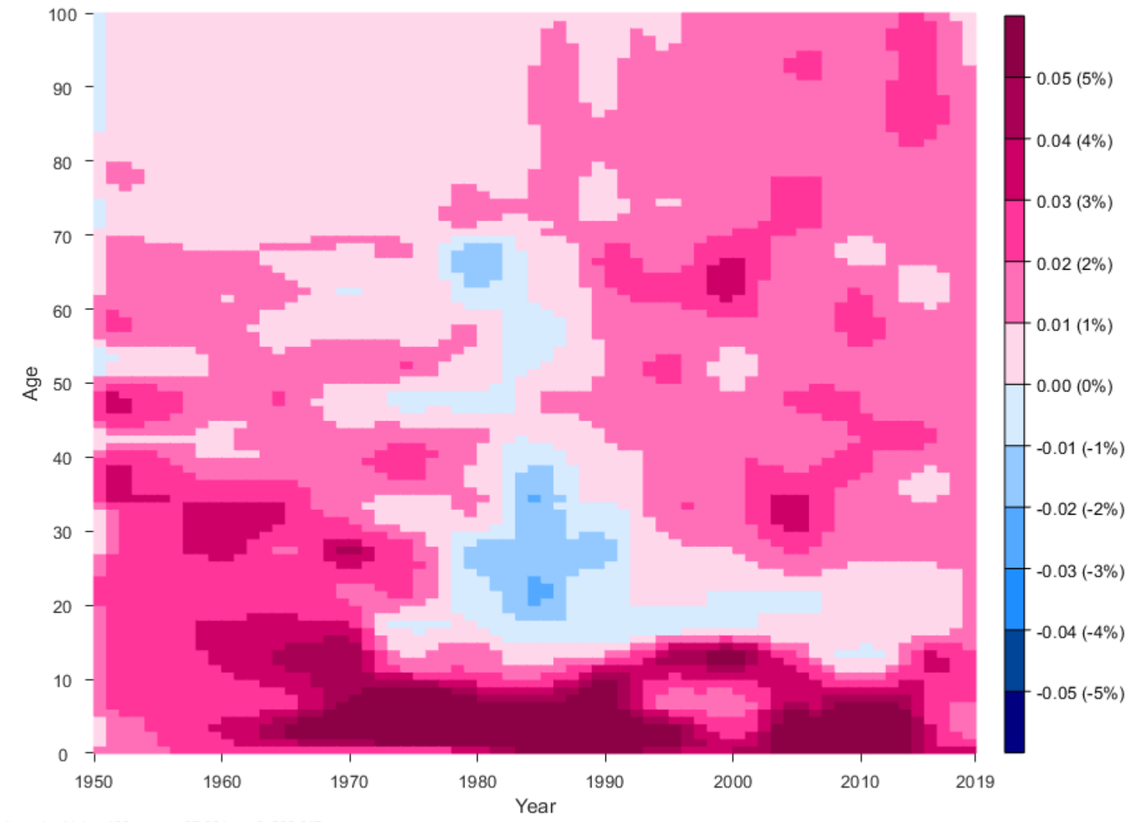
Females



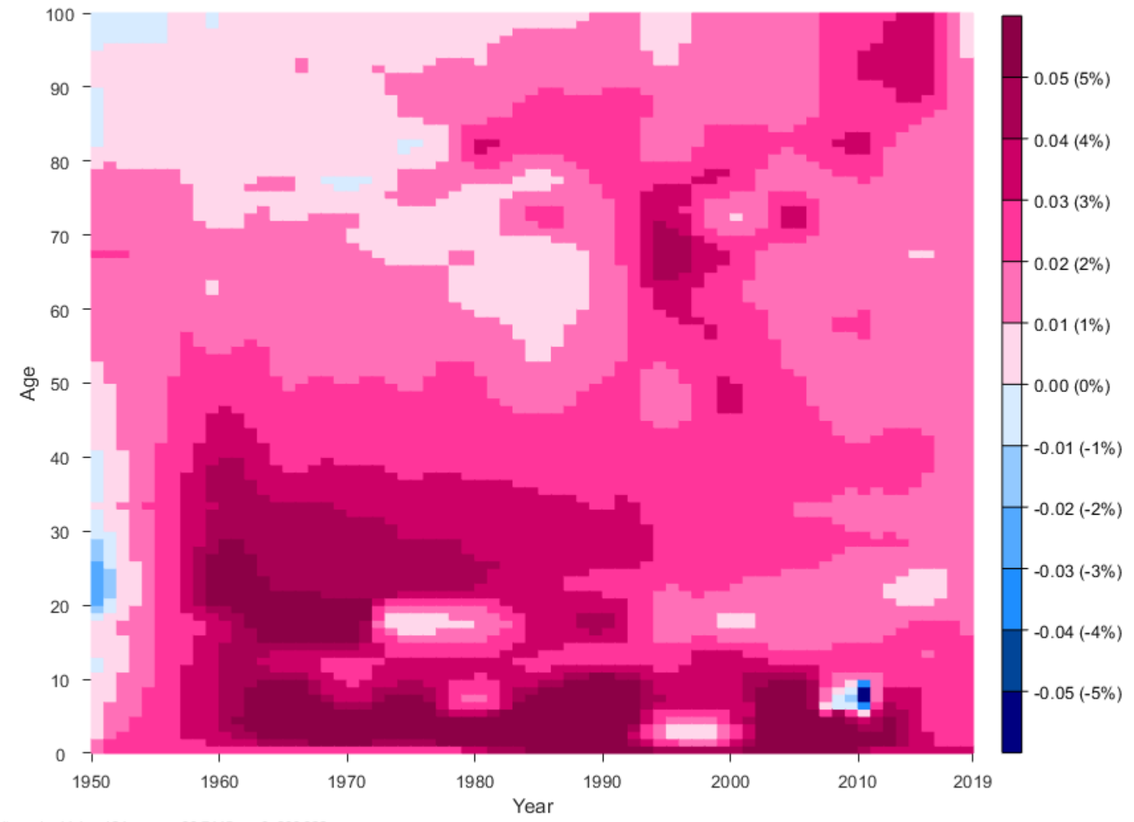
iters=4, nblobs=195, varprc=95.8093, var0=2033.38

Brazil

Males

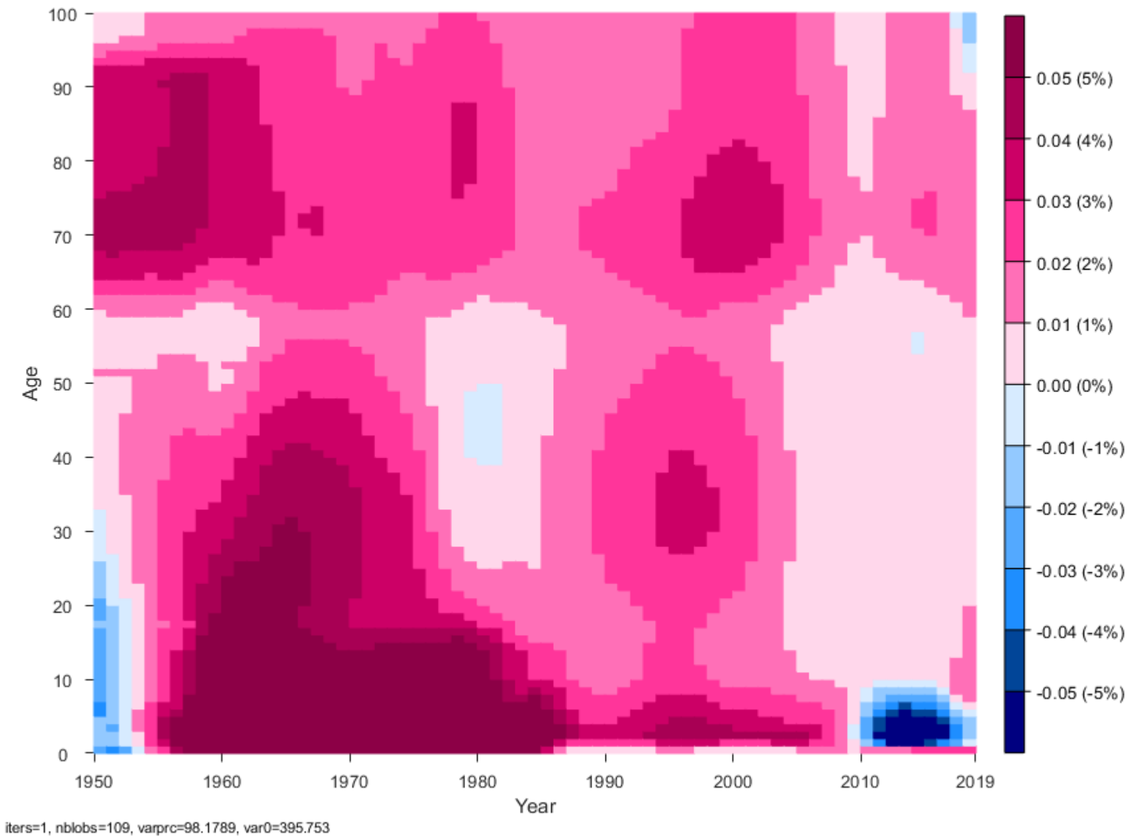


Females



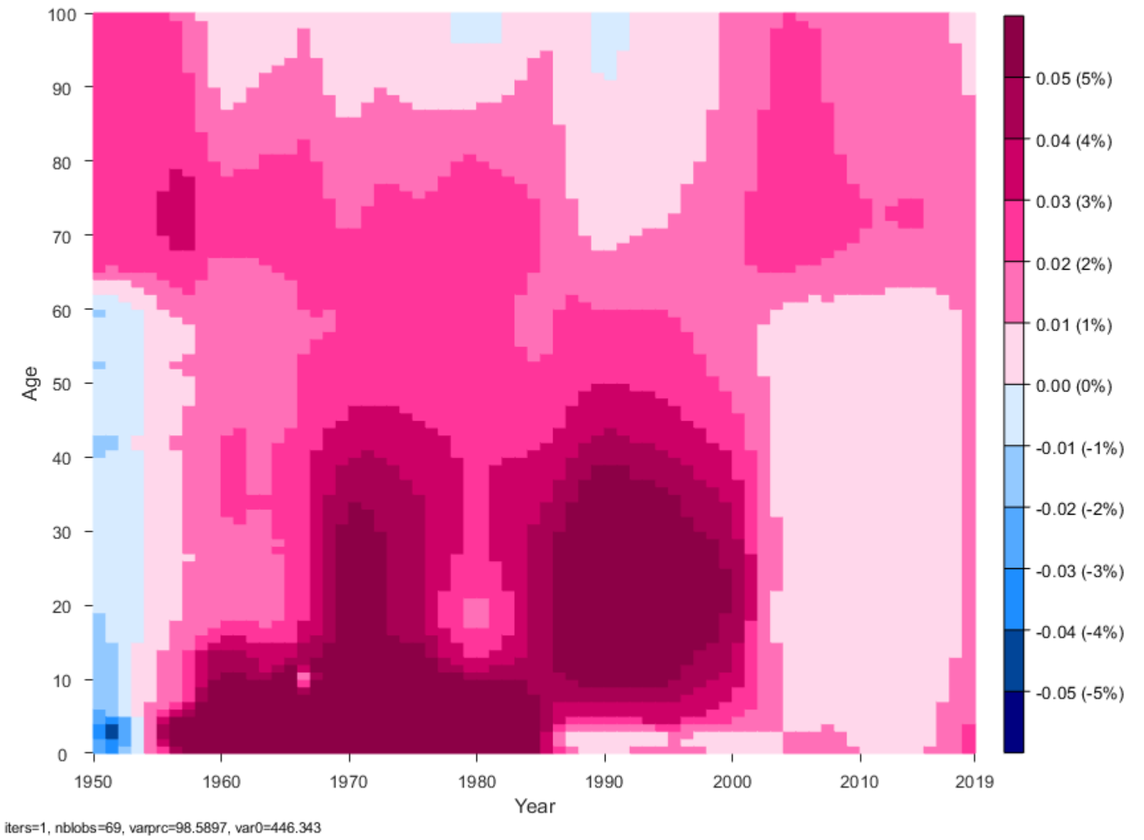
Brunei Darussalam

Males



iters=1, nblobs=109, varprc=98.1789, var0=395.753

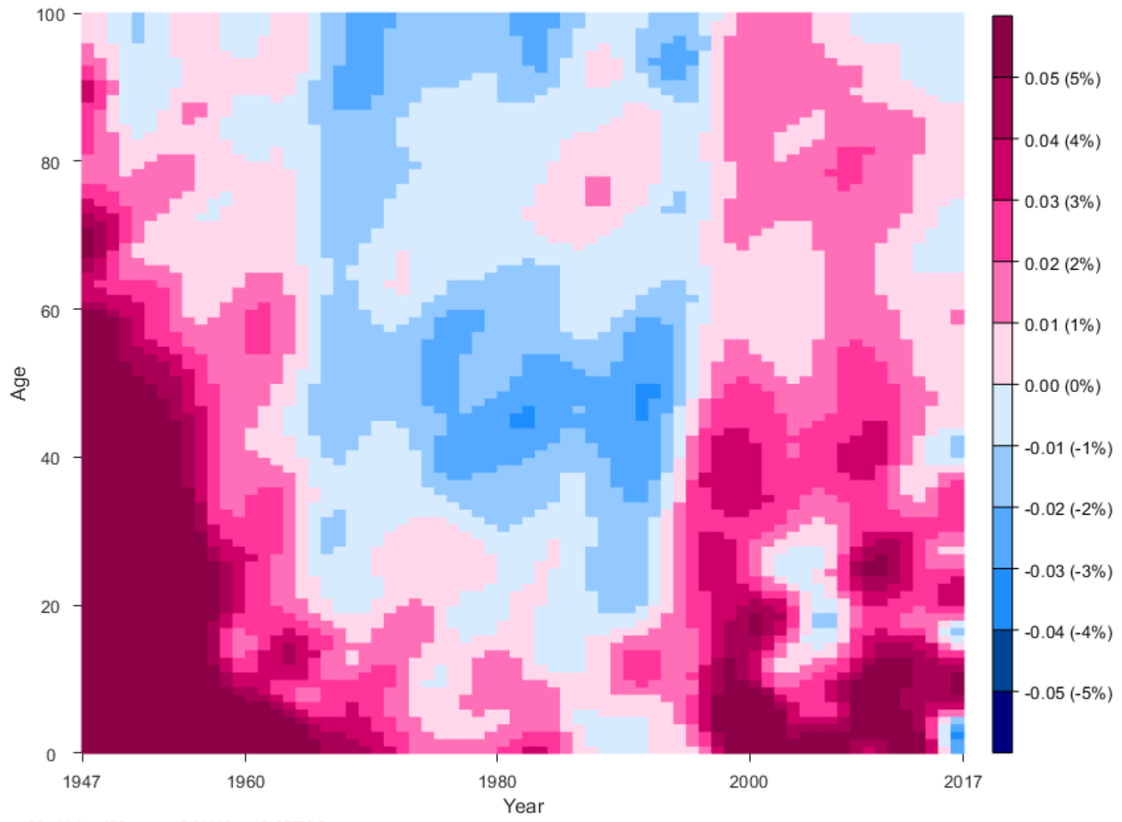
Females



iters=1, nblobs=69, varprc=98.5897, var0=446.343

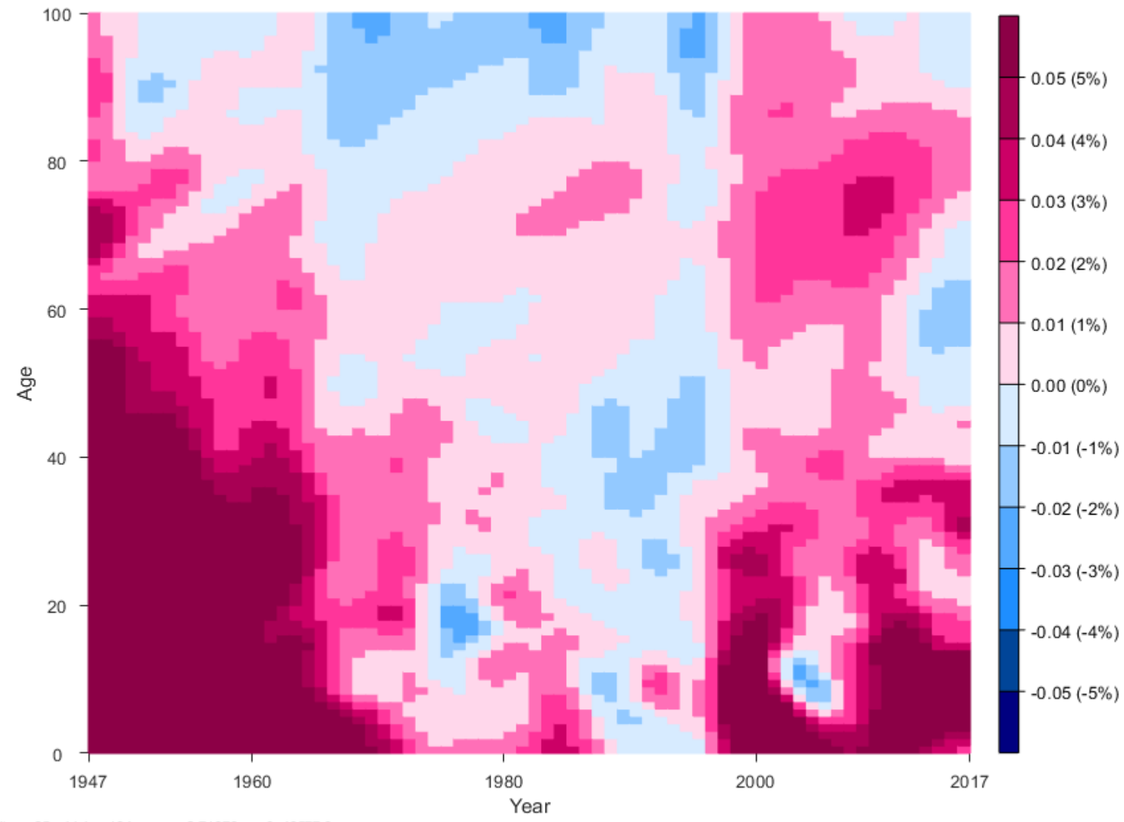
Bulgaria

Males



iters=25, nblobs=196, varprc=3.21112, var0=27733.2

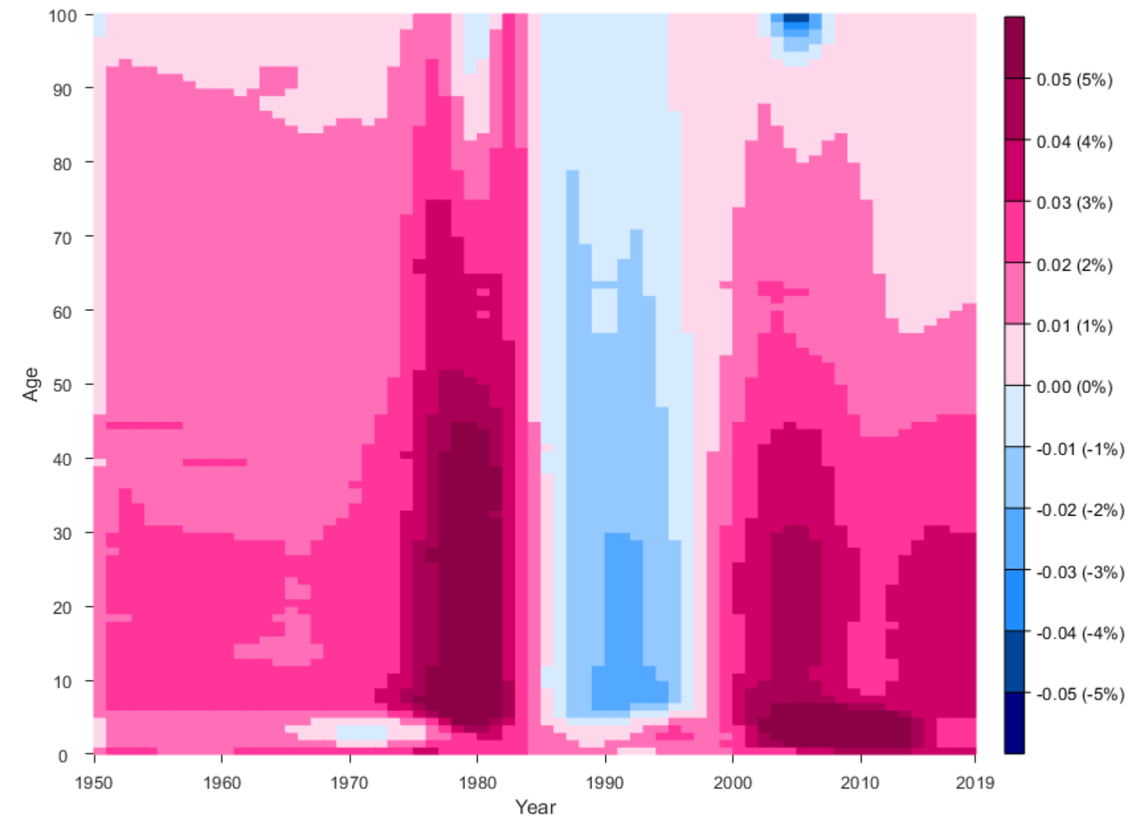
Females



iters=25, nblobs=194, varprc=2.71878, var0=43577.9

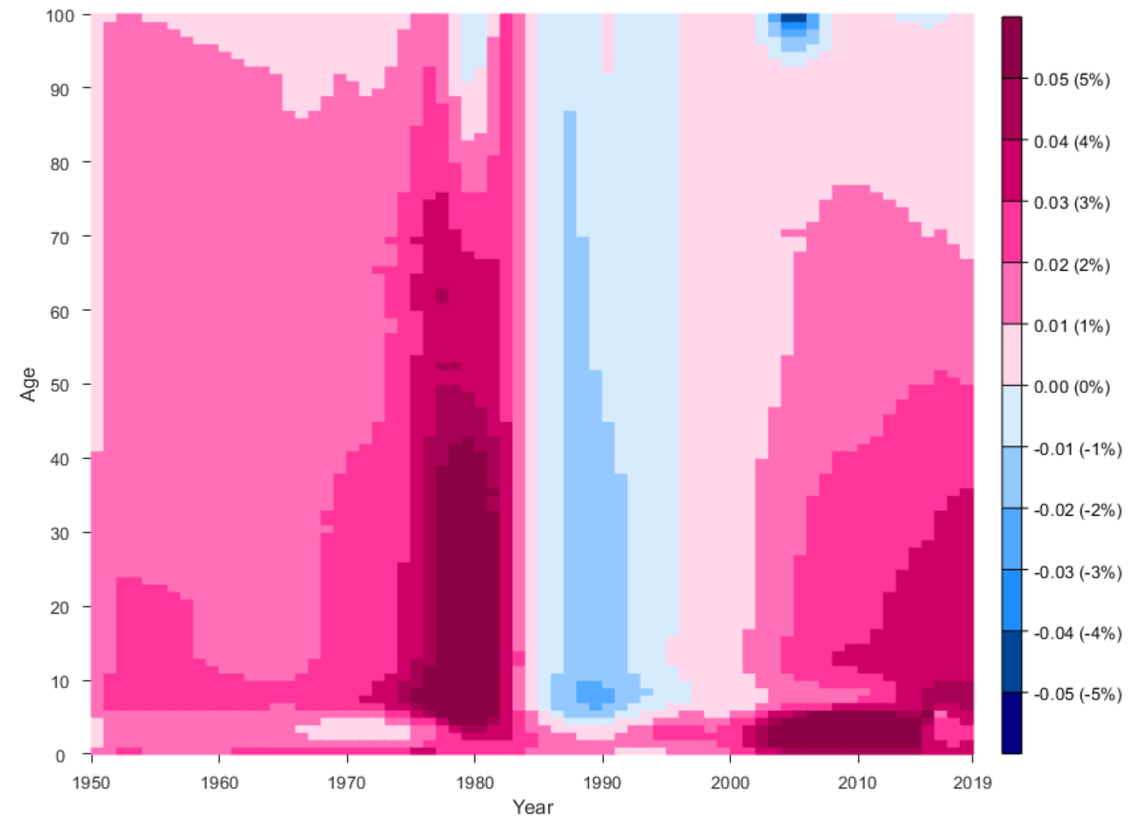
Burkina Faso

Males



iters=1, nblobs=82, varprc=97.9838, var0=326.944

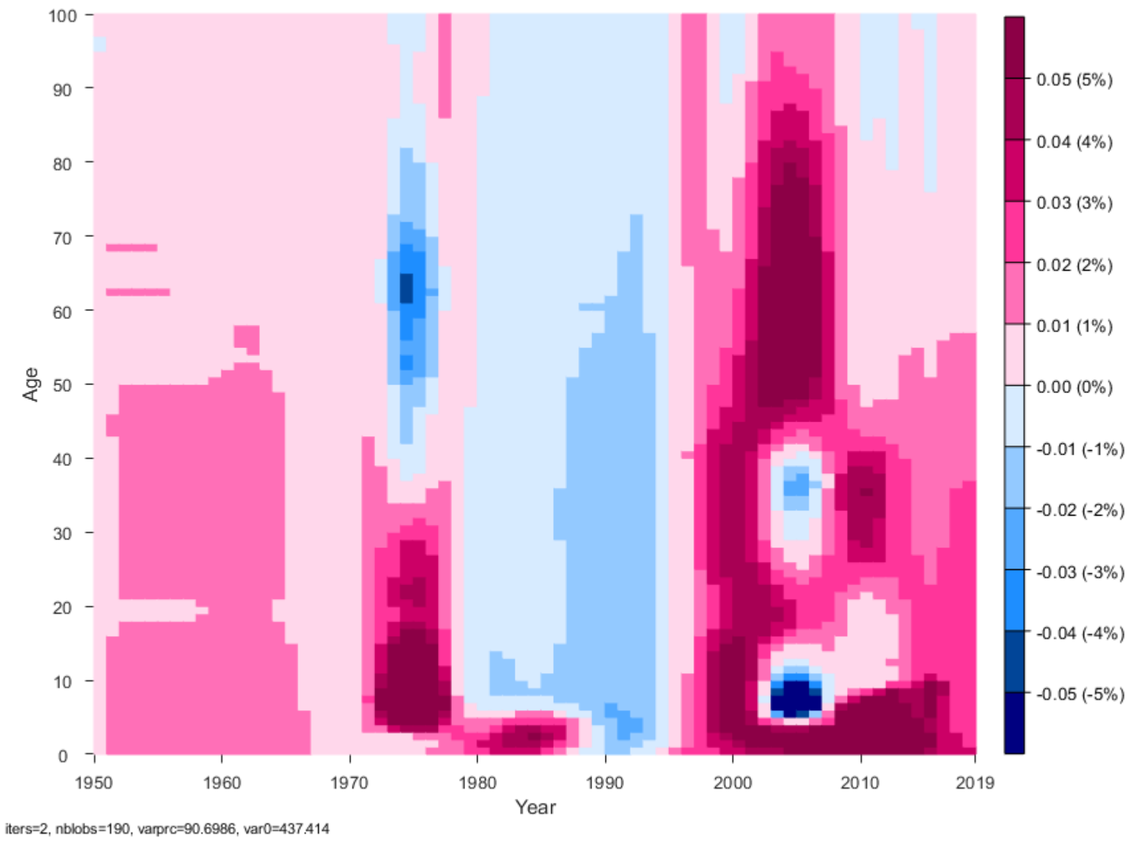
Females



iters=1, nblobs=76, varprc=97.7823, var0=263.151

Burundi

Males



iters=2, nblobs=190, varprc=90.6986, var0=437.414

Females

iters=5, nblobs=186, varprc=83.66, var0=417.064

Cabo Verde

Males

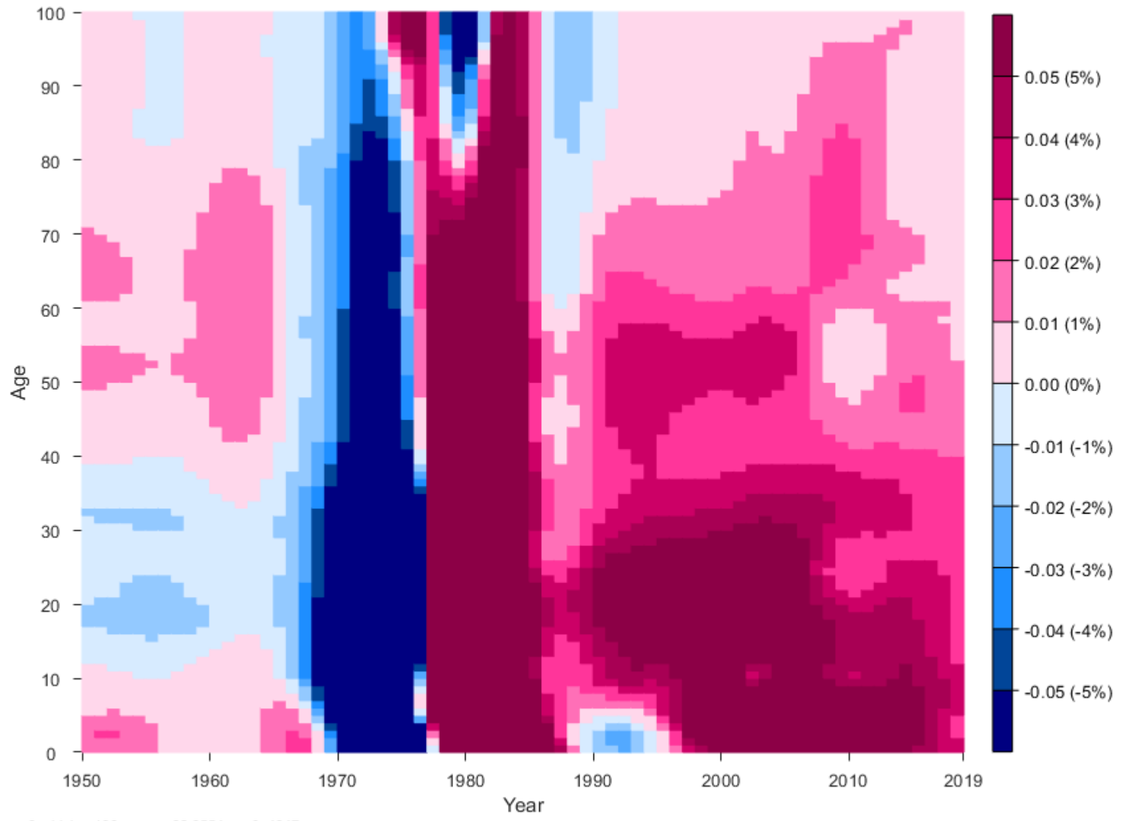
iters=1, nblobs=74, varprc=98.0209, var0=317.91

Females

iters=1, nblobs=52, varprc=98.8144, var0=634.176

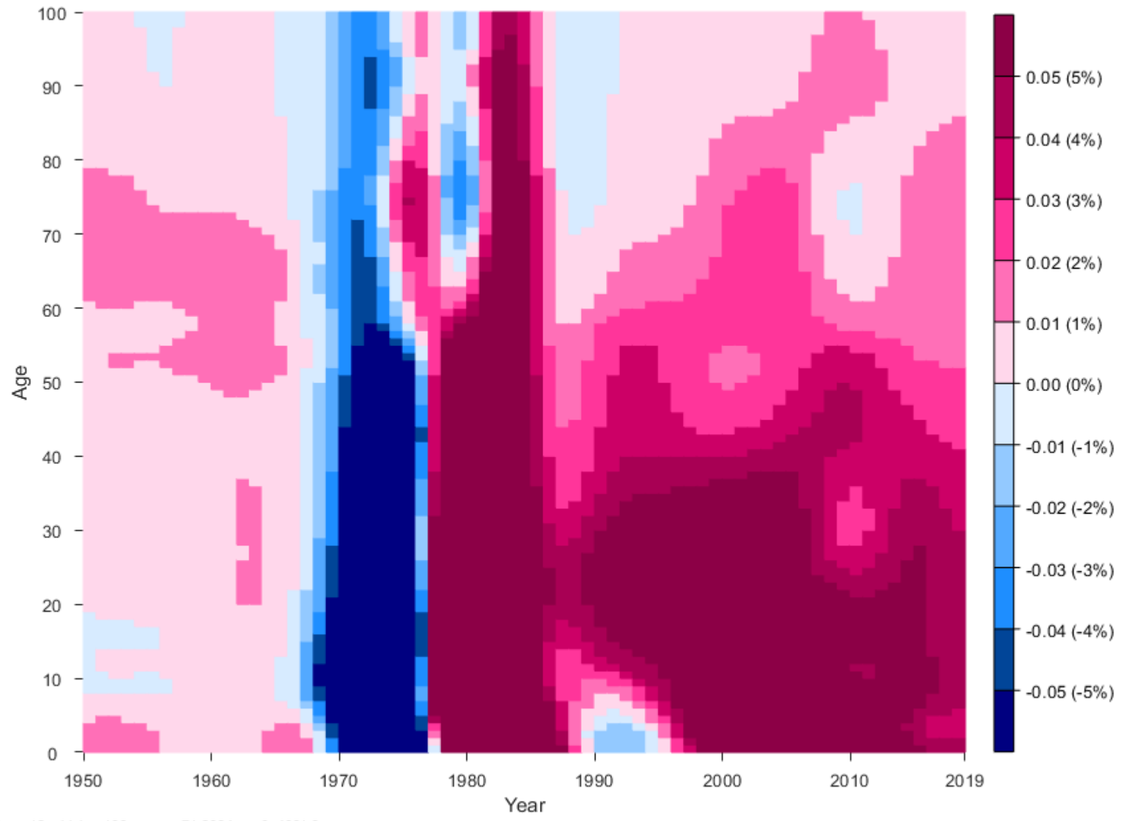
Cambodia

Males



iters=6, nblobs=196, varprc=82.8554, var0=4847

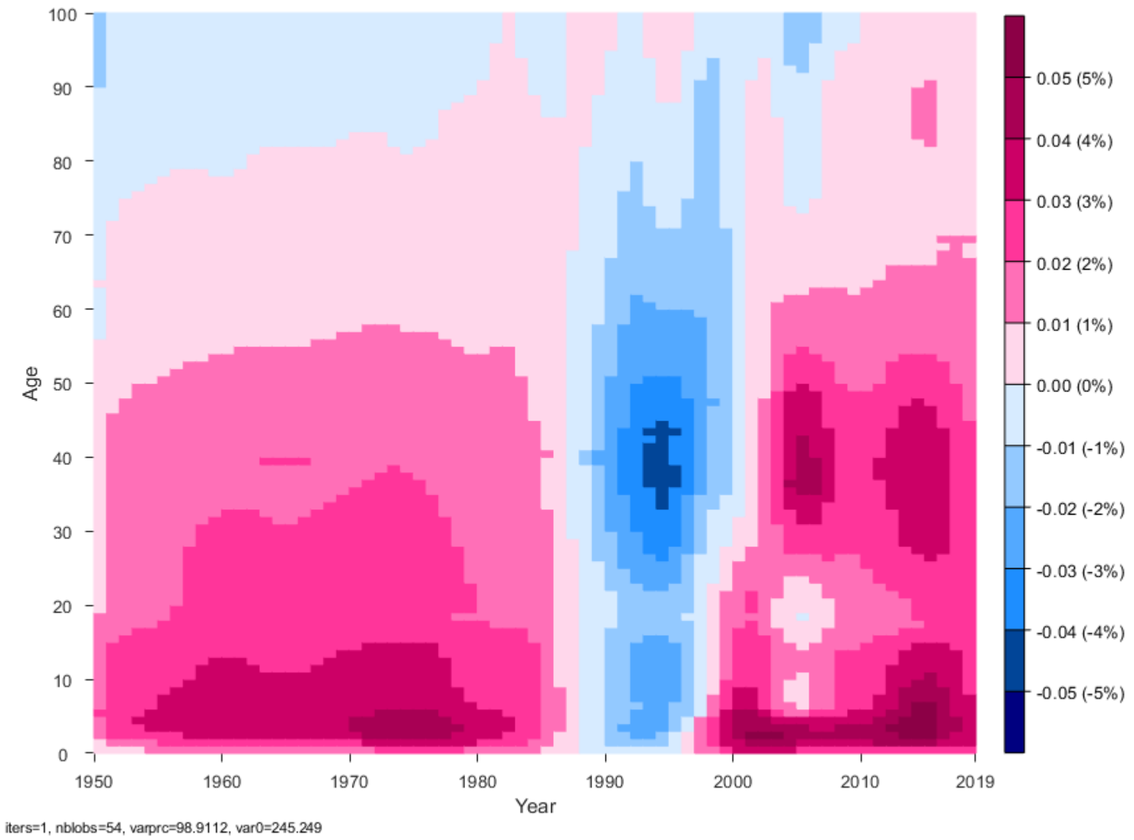
Females



iters=12, nblobs=196, varprc=71.2084, var0=4091.8

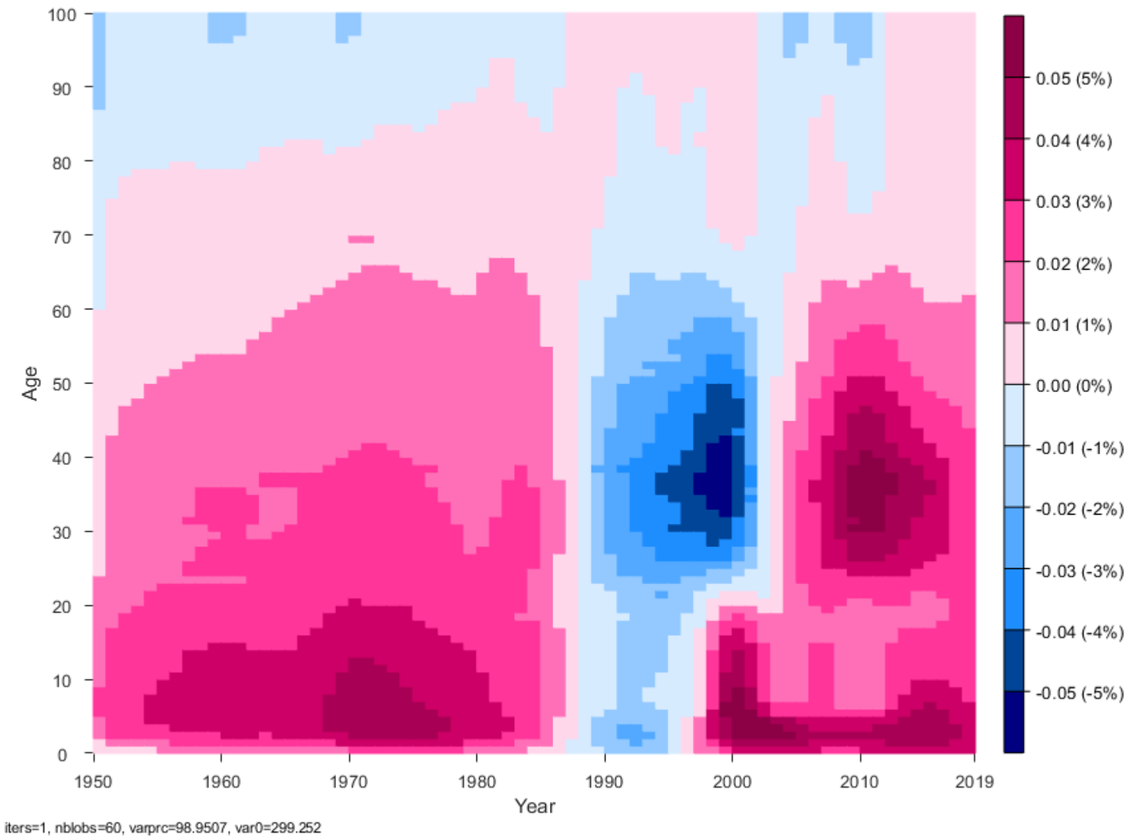
Cameroon

Males



iters=1, nblobs=54, varprc=98.9112, var0=245.249

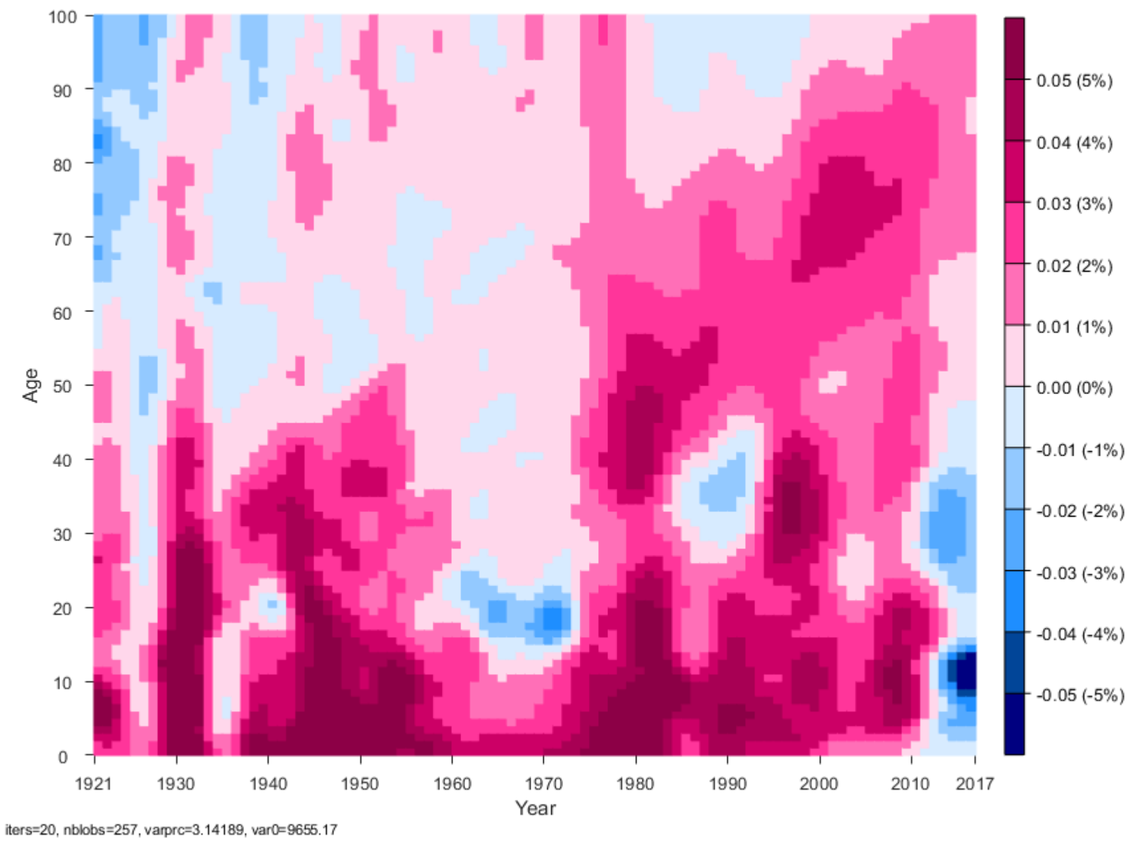
Females



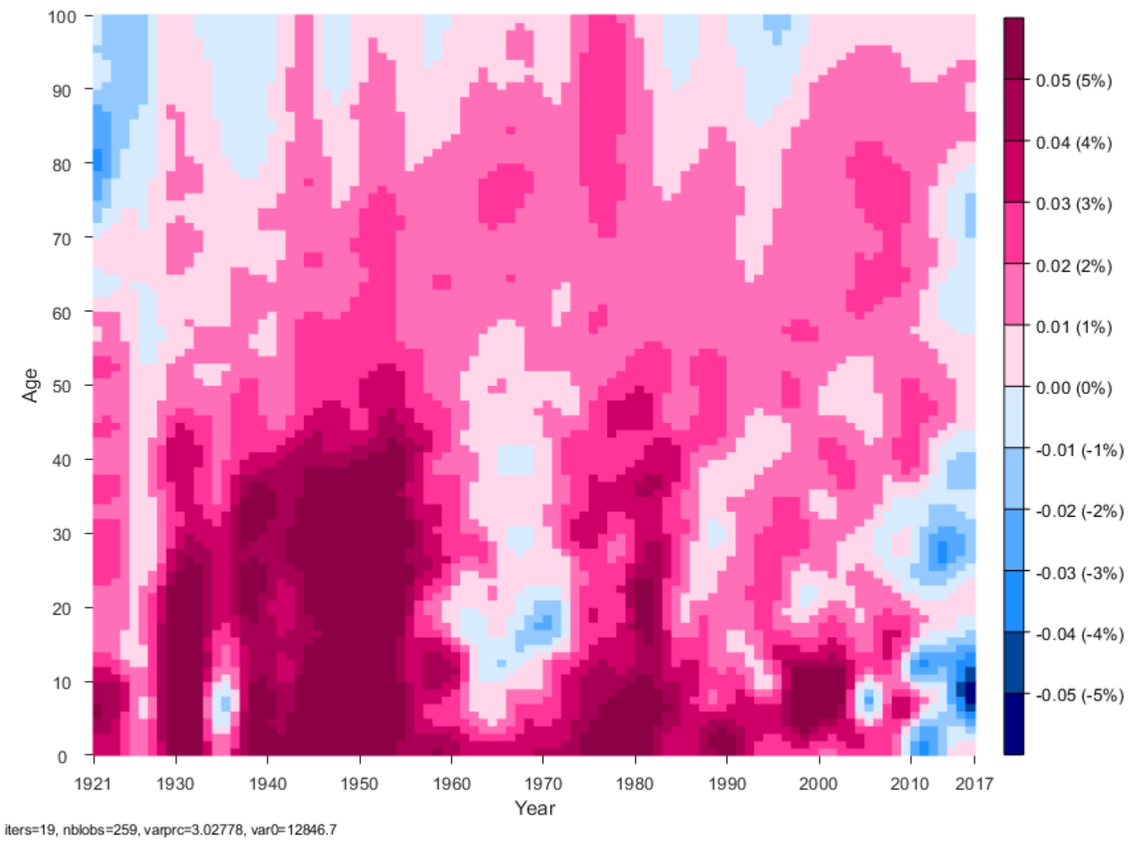
iters=1, nblobs=60, varprc=98.9507, var0=299.252

Canada

Males

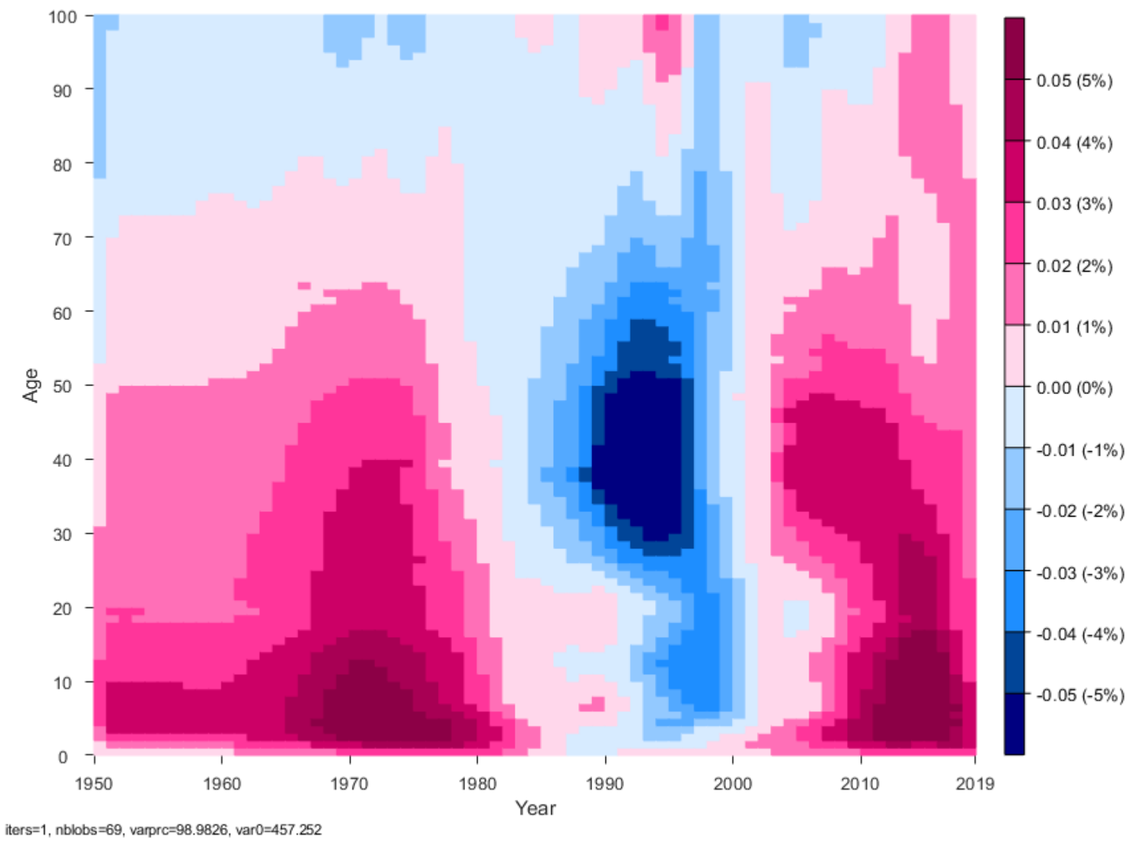


Females



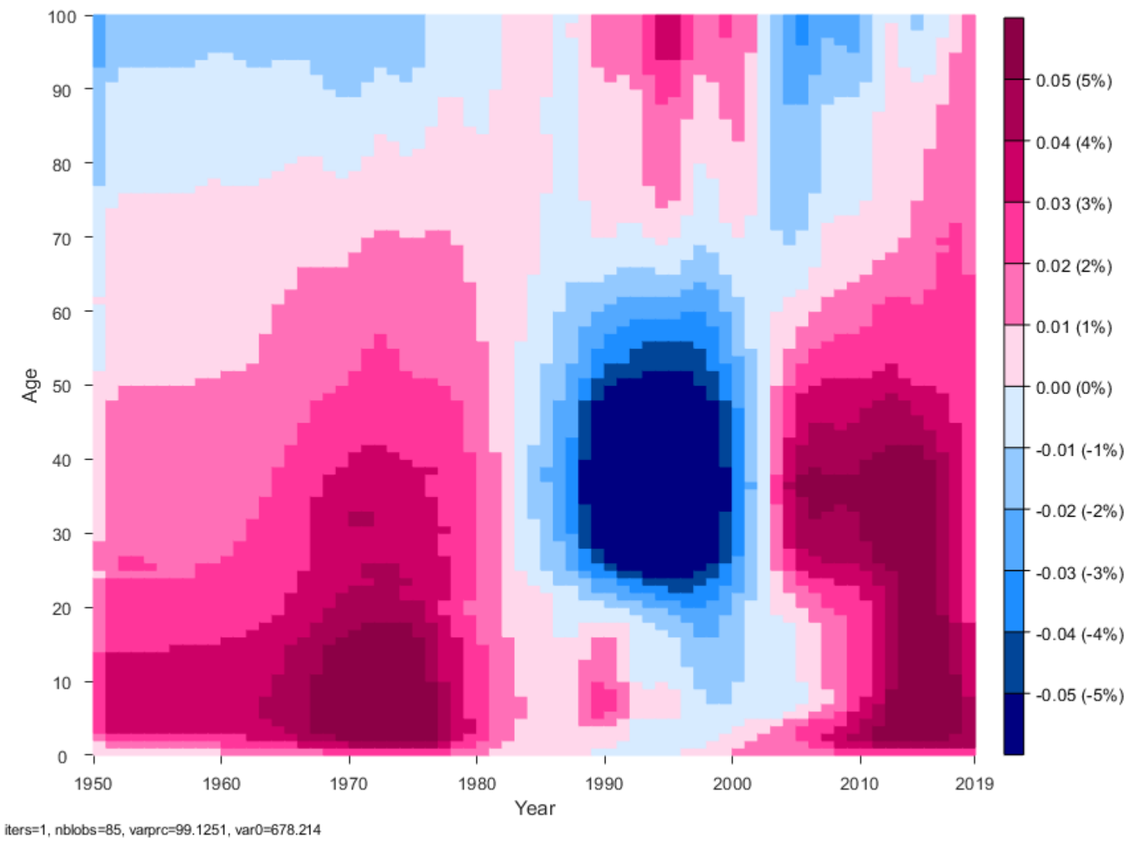
Central African Republic

Males



iters=1, nblobs=69, varprc=98.9826, var0=457.252

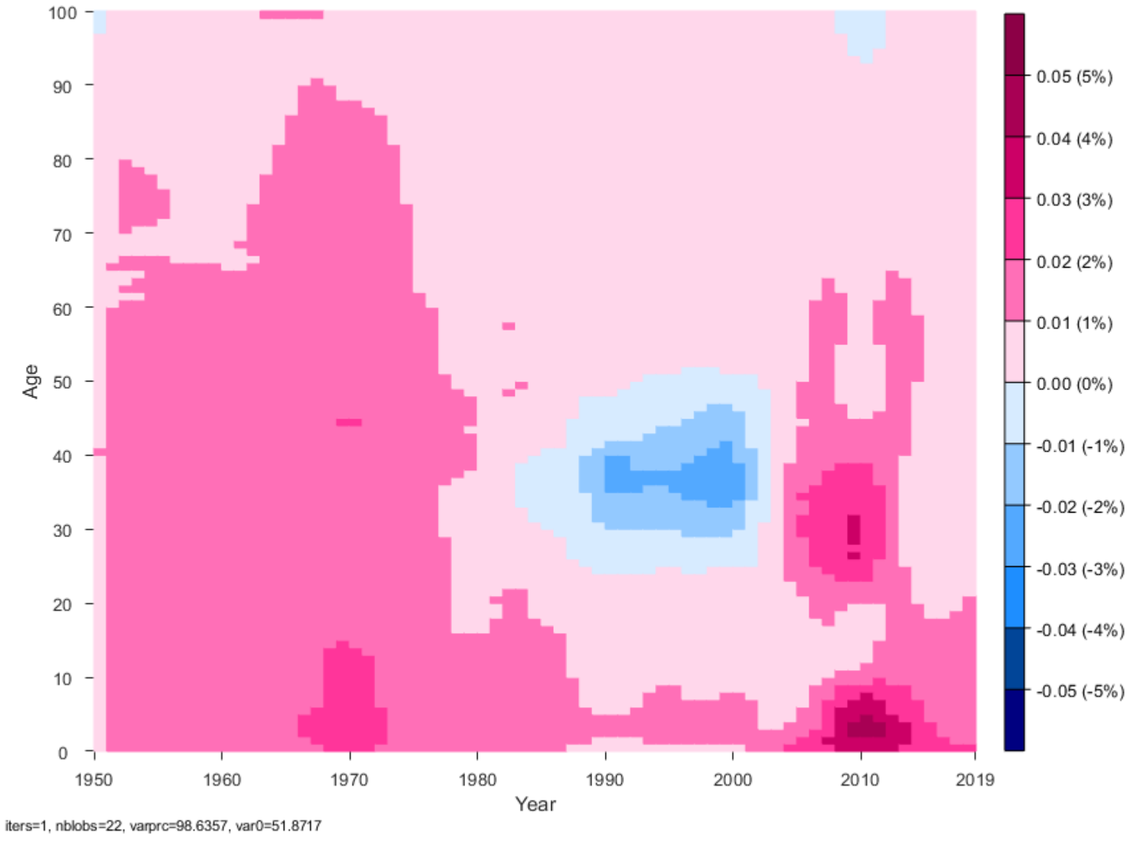
Females



iters=1, nblobs=85, varprc=99.1251, var0=678.214

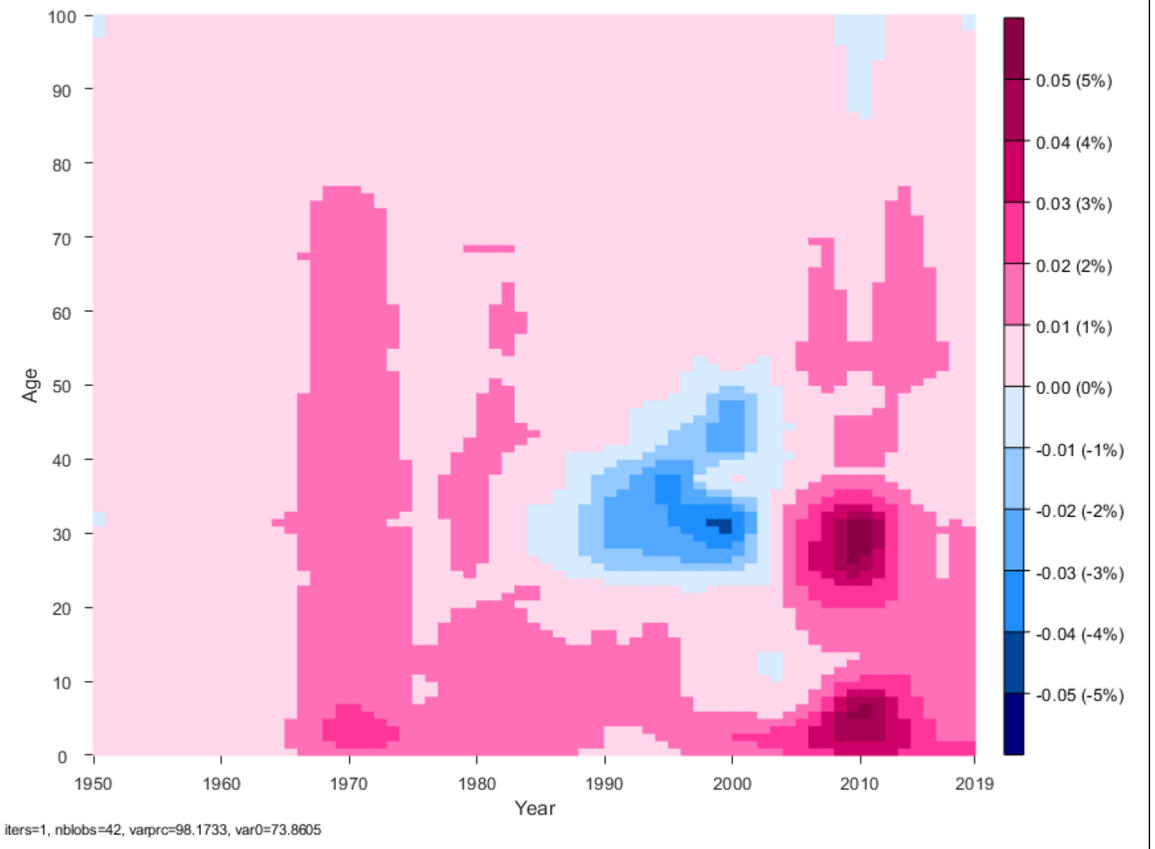
Chad

Males



iters=1, nblobs=22, varprc=98.6357, var0=51.8717

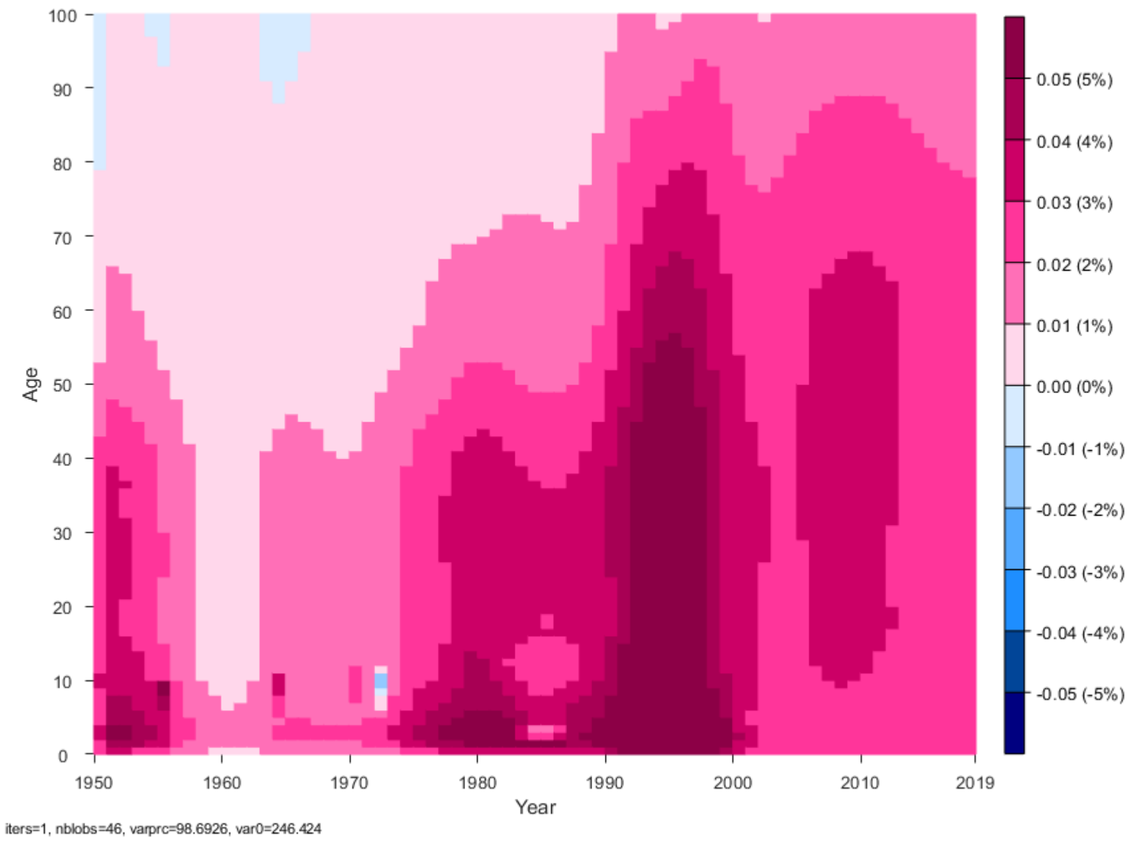
Females



iters=1, nblobs=42, varprc=98.1733, var0=73.8605

Channel Islands

Males



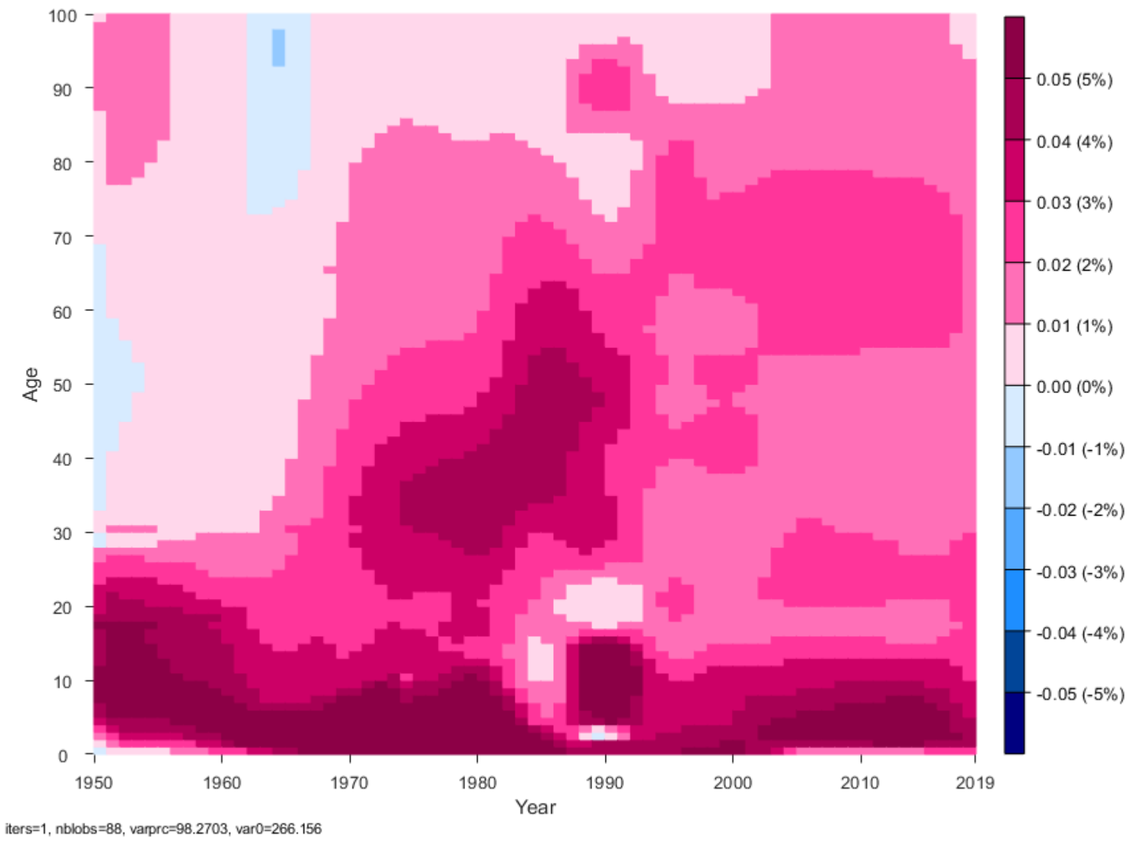
iters=1, nblobs=46, varprc=98.6926, var0=246.424

Females

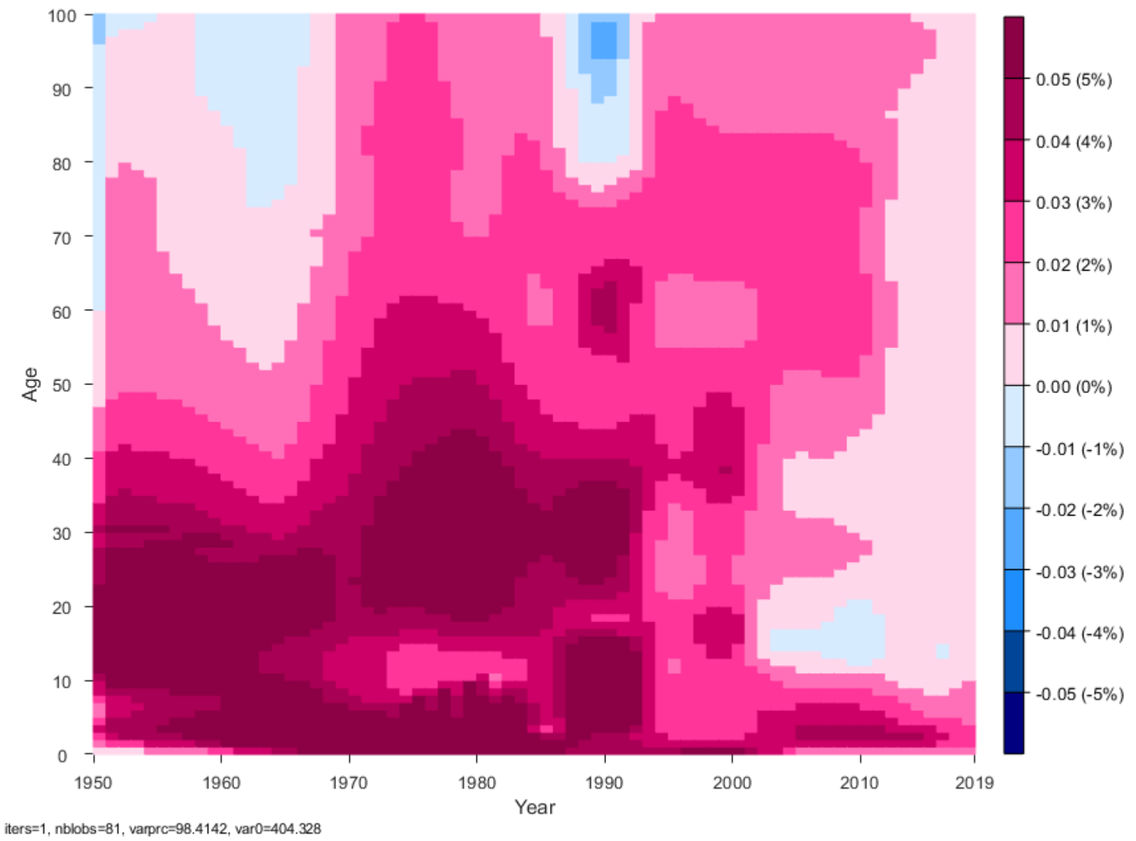
iters=1, nblobs=36, varprc=97.7499, var0=117.256

Chile

Males

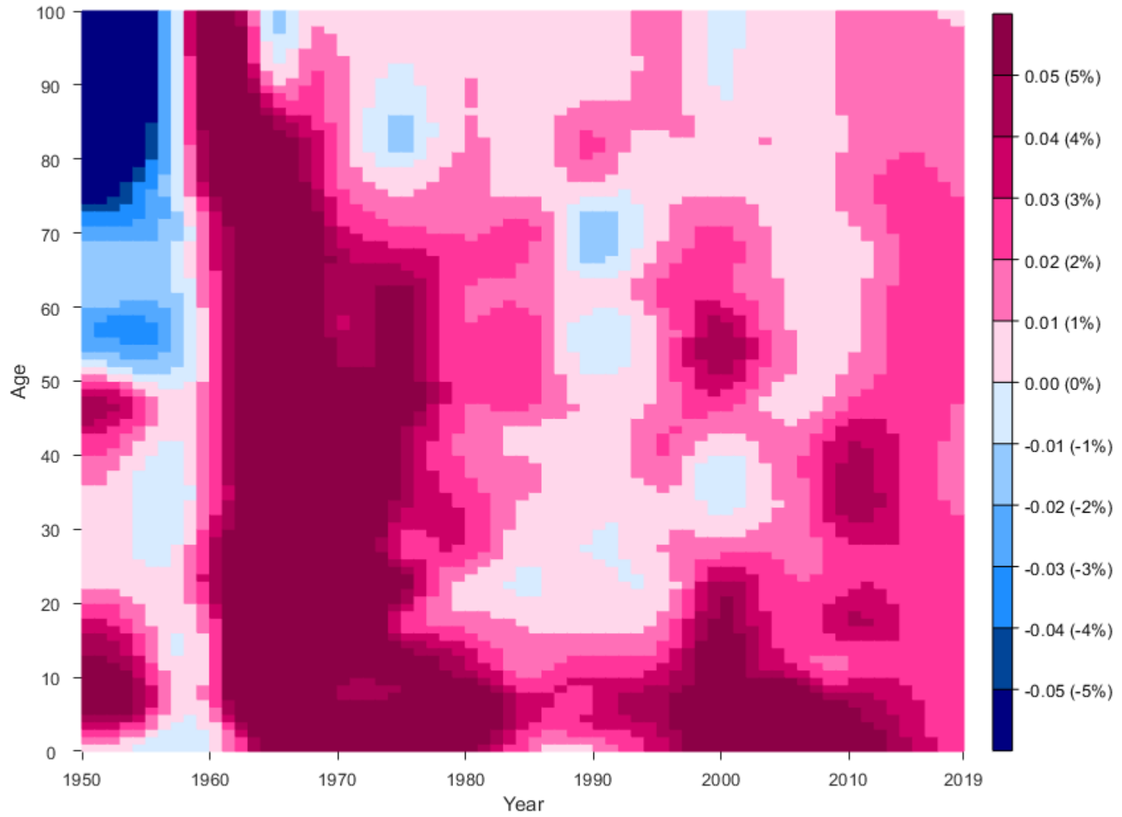


Females



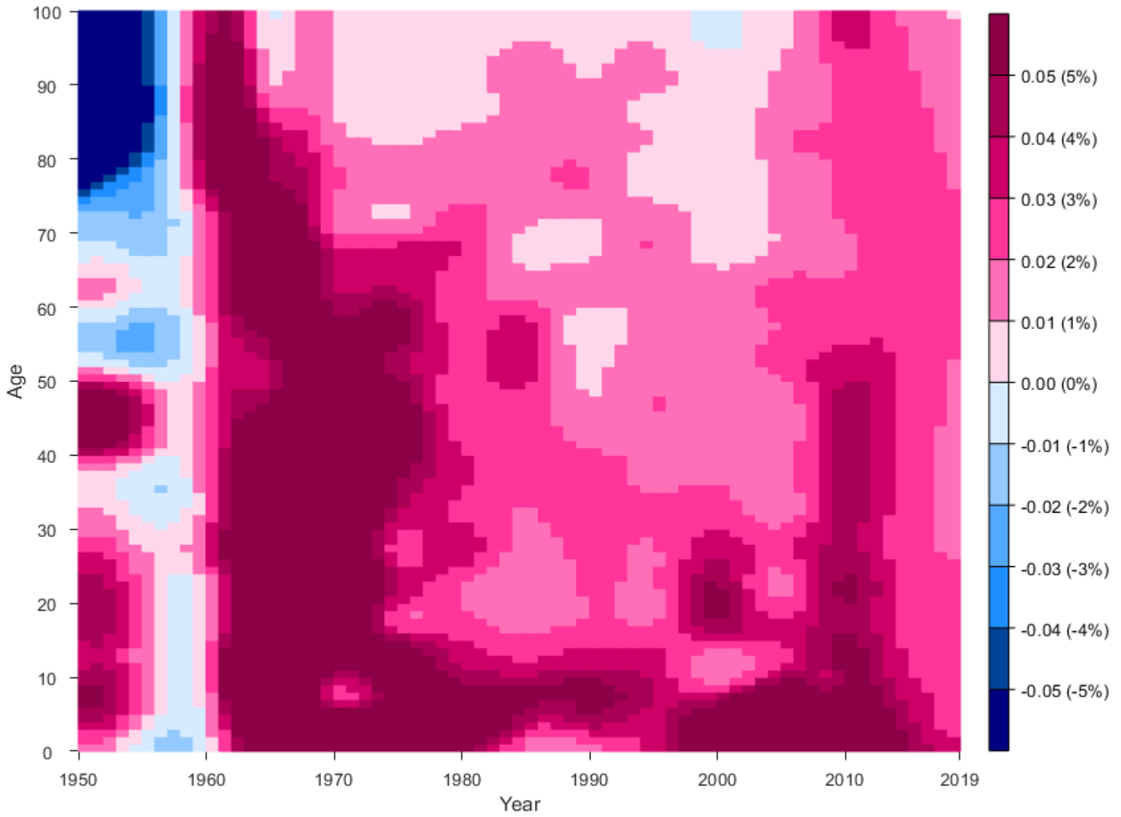
China

Males



iters=9, nblobs=190, varprc=85.4912, var0=1703.83

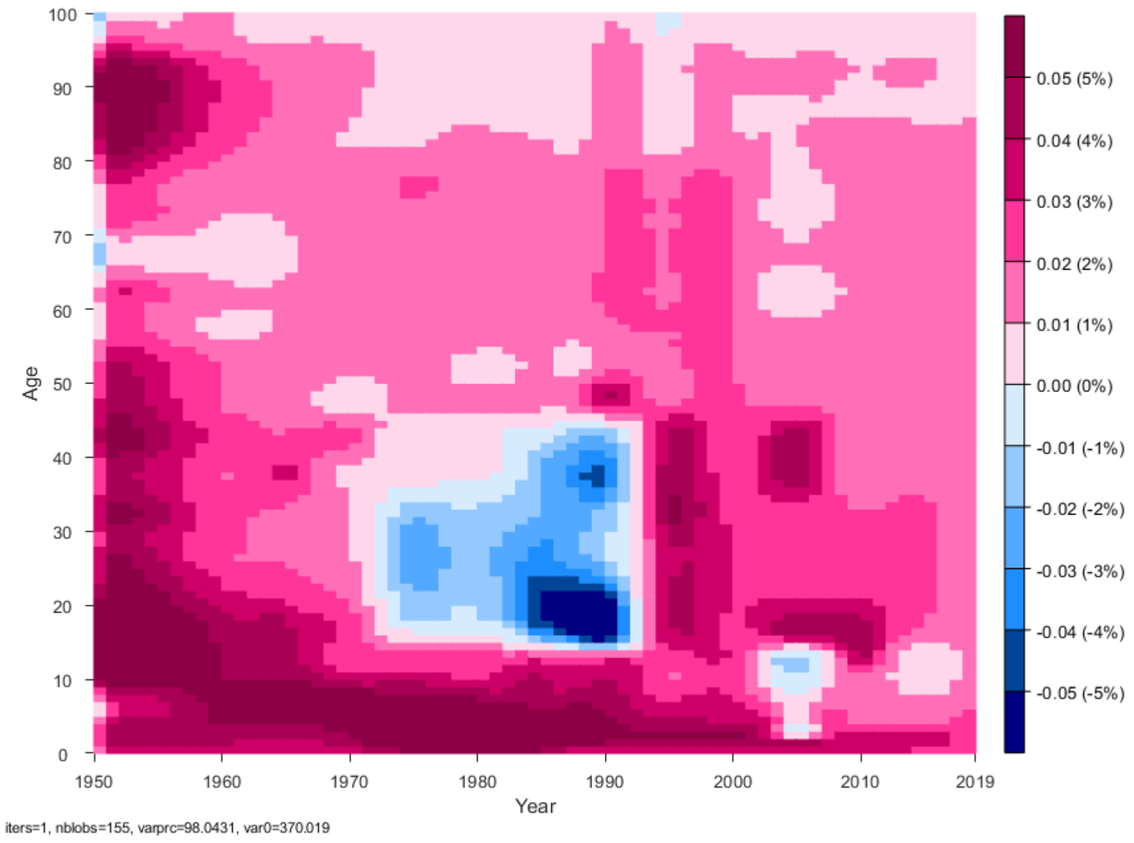
Females



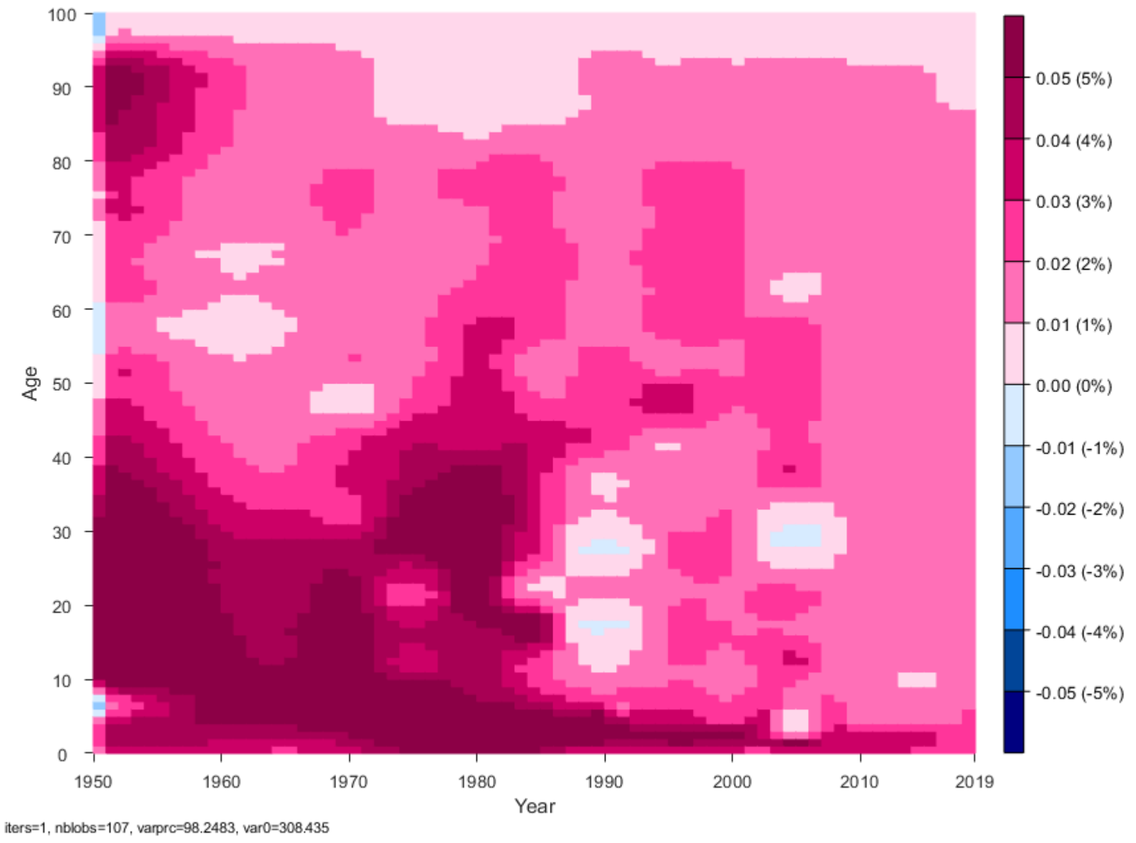
iters=8, nblobs=191, varprc=86.1525, var0=1467.39

Colombia

Males



Females

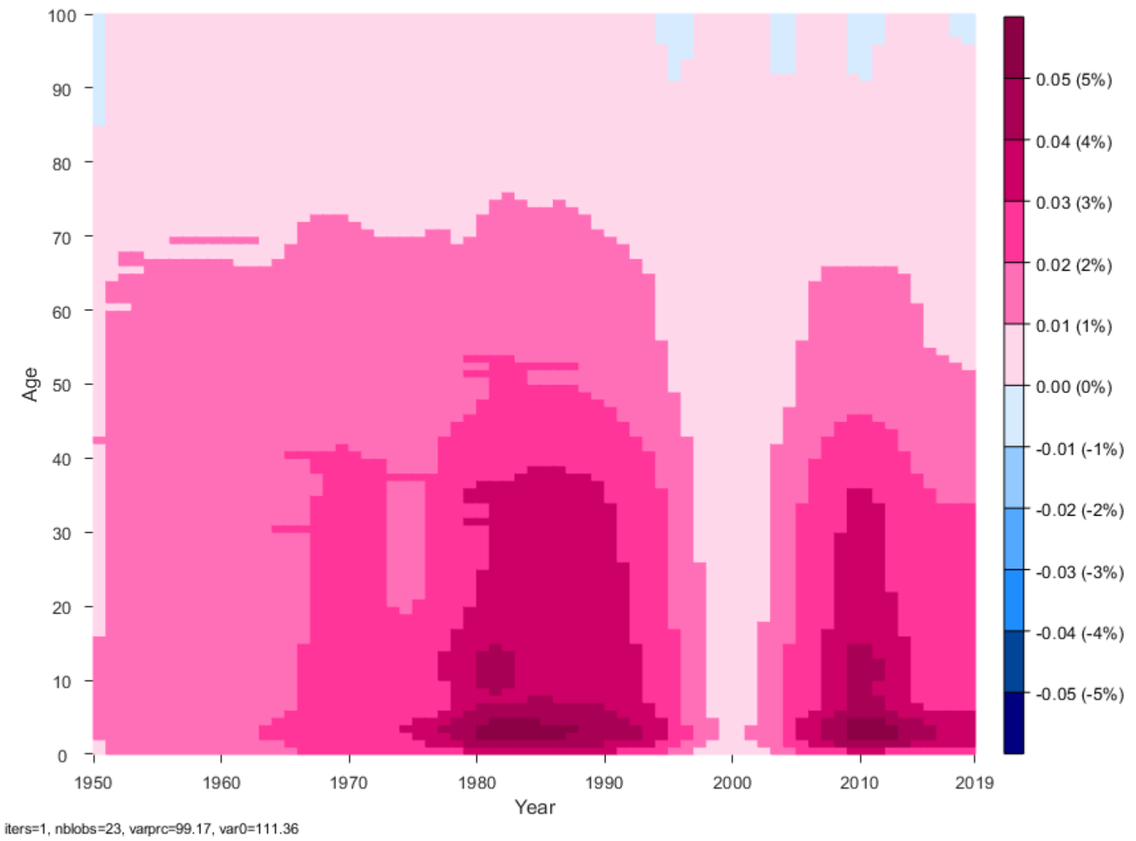


Comoros

Males

iters=1, nblobs=23, varprc=99.1717, var0=97.0368

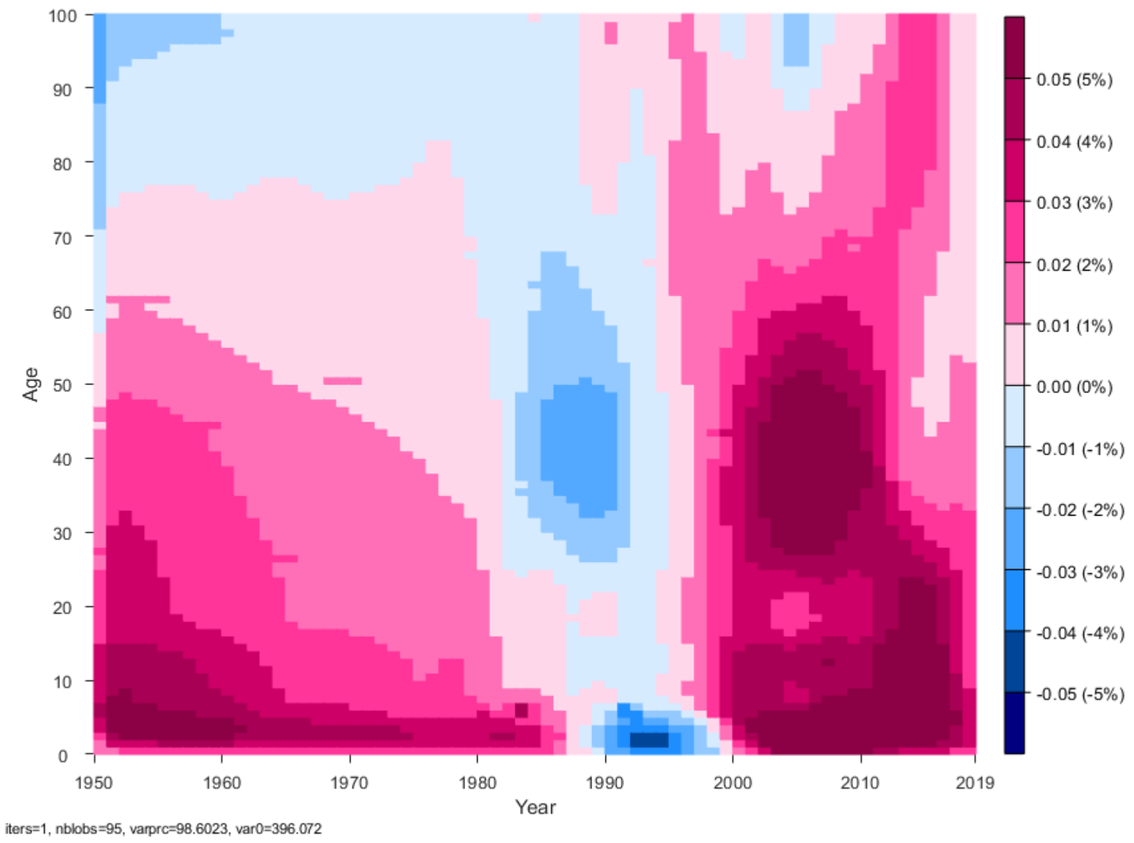
Females



iters=1, nblobs=23, varprc=99.17, var0=111.36

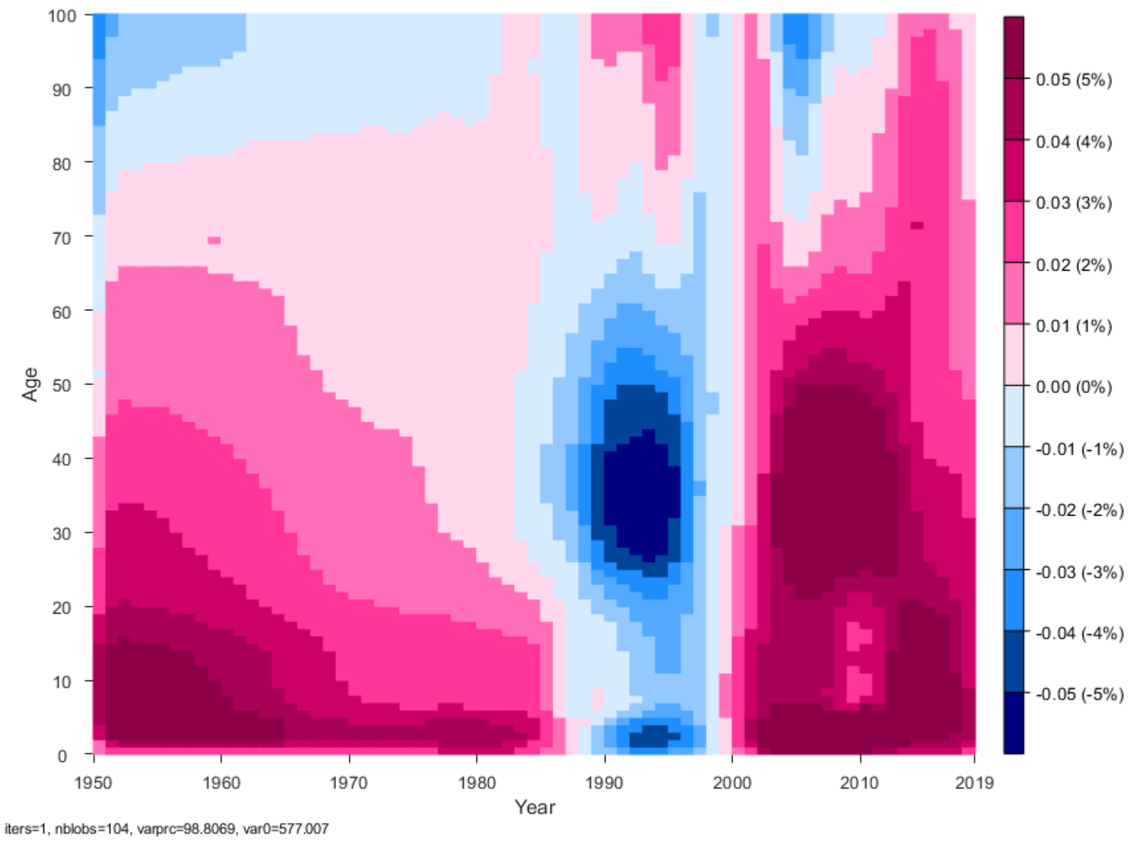
Congo

Males



iters=1, nblobs=95, varprc=98.6023, var0=396.072

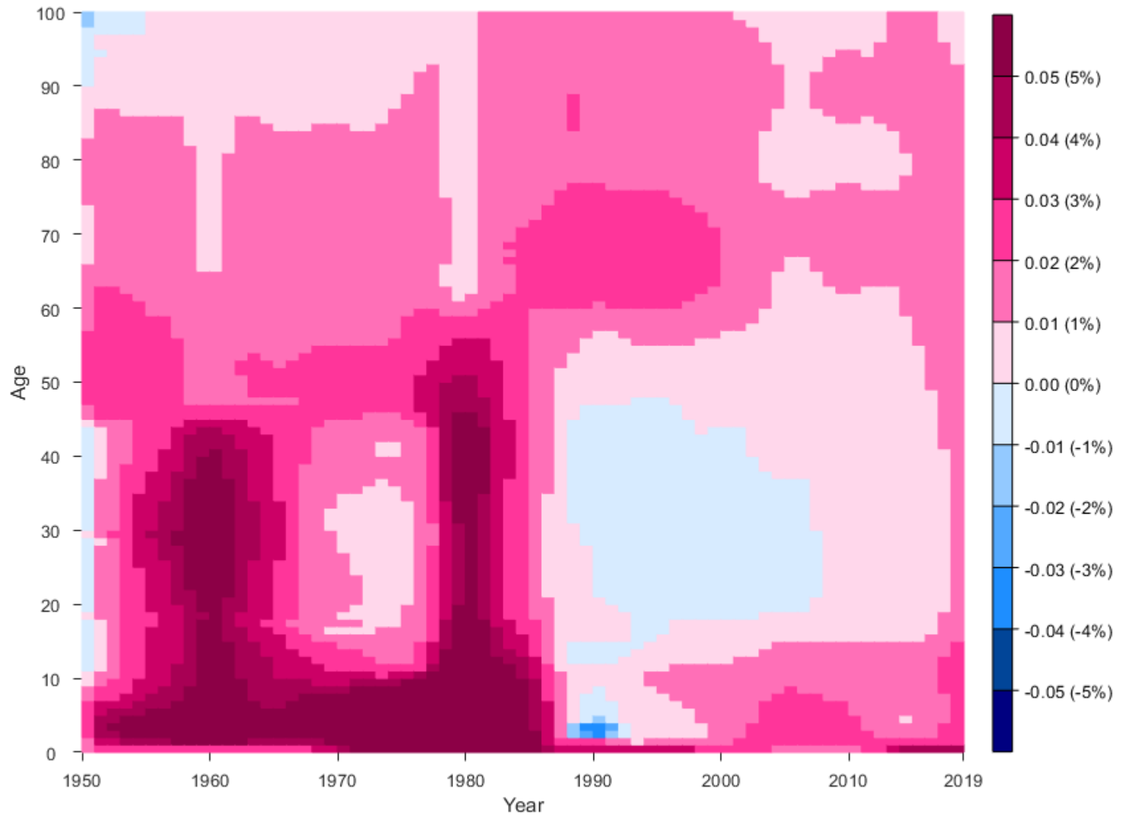
Females



iters=1, nblobs=104, varprc=98.8069, var0=577.007

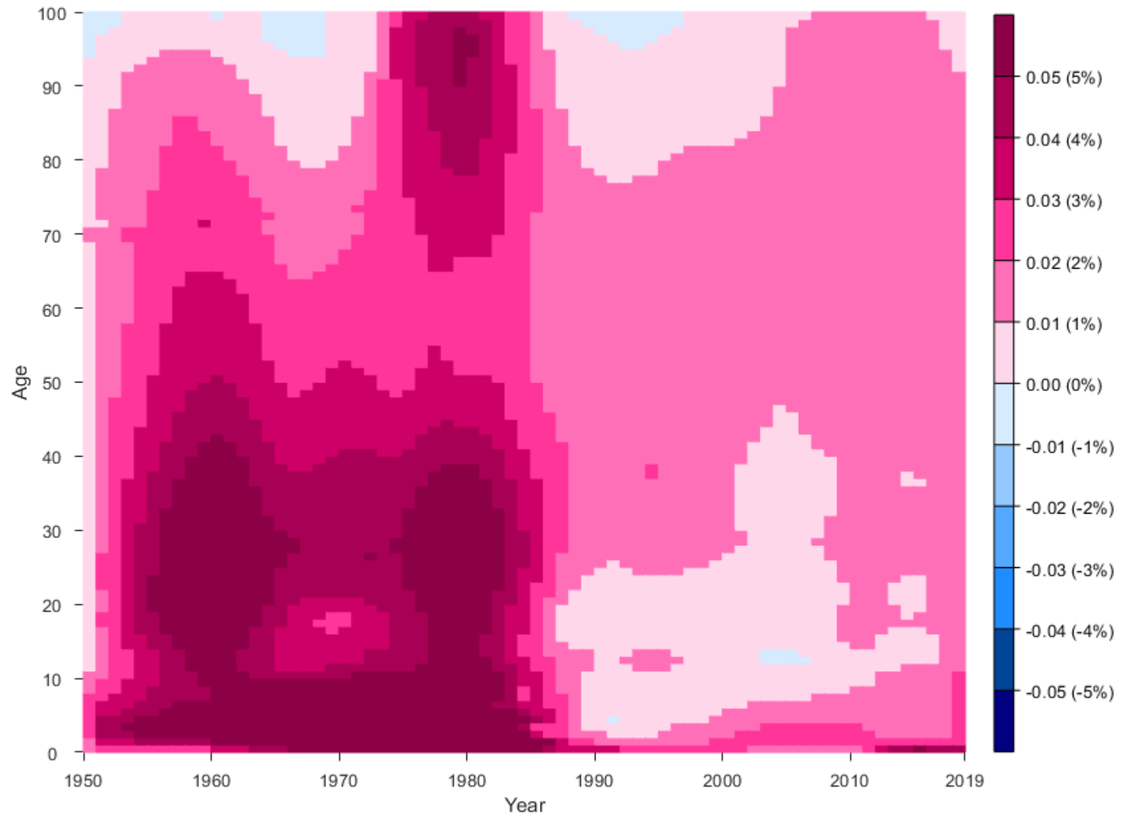
Costa Rica

Males



iters=1, nblobs=75, varprc=98.3489, var0=362.01

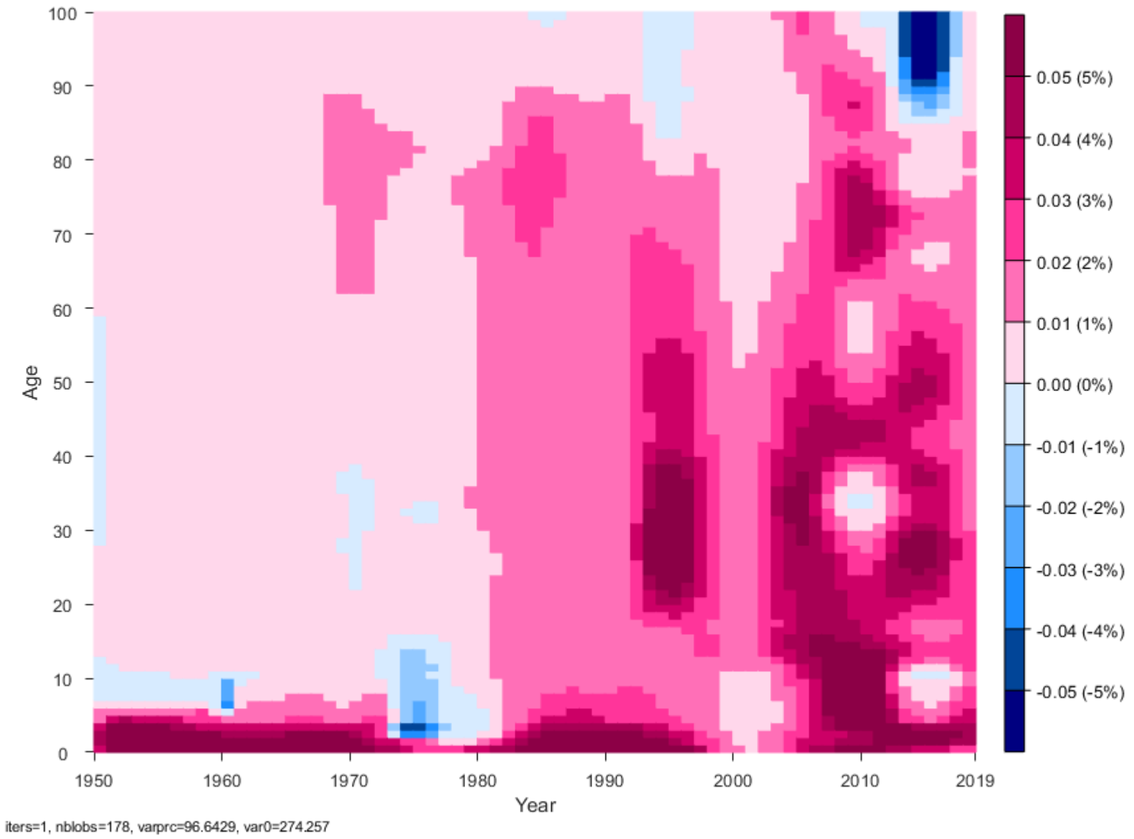
Females



iters=1, nblobs=51, varprc=98.8227, var0=401.383

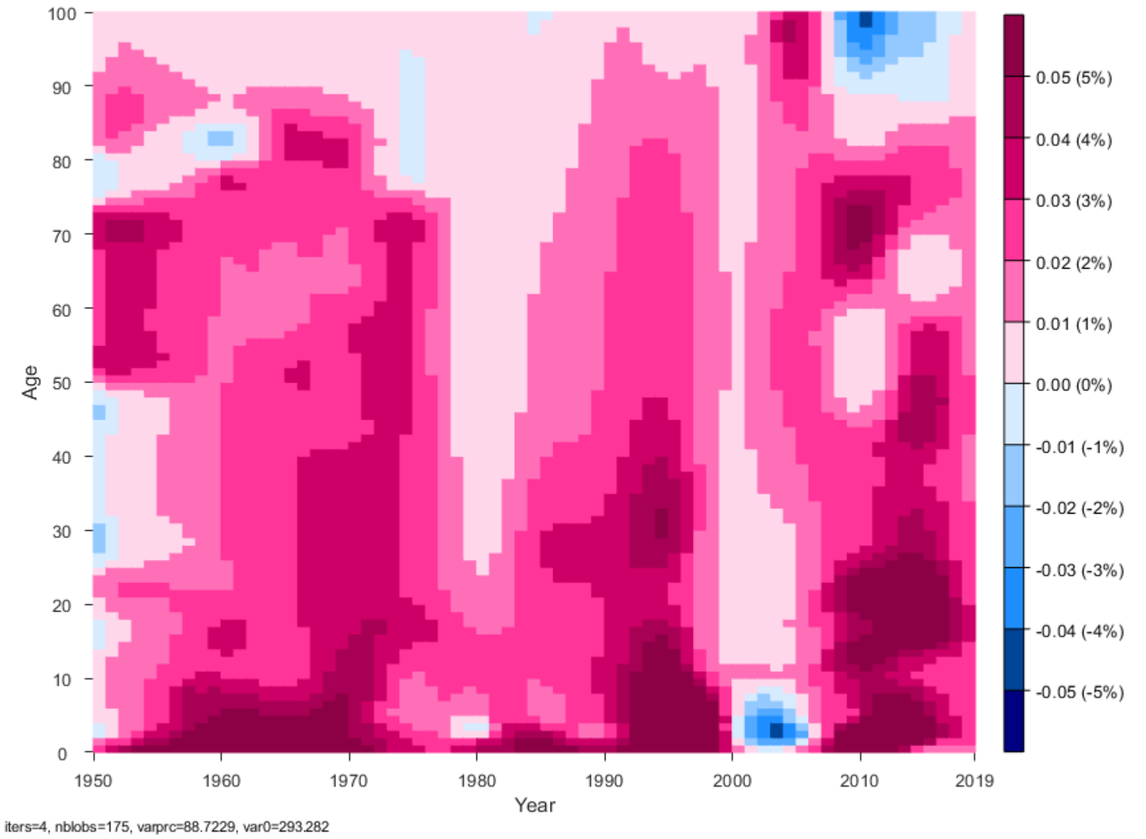
Croatia

Males



iters=1, nblobs=178, varprc=96.6429, var0=274.257

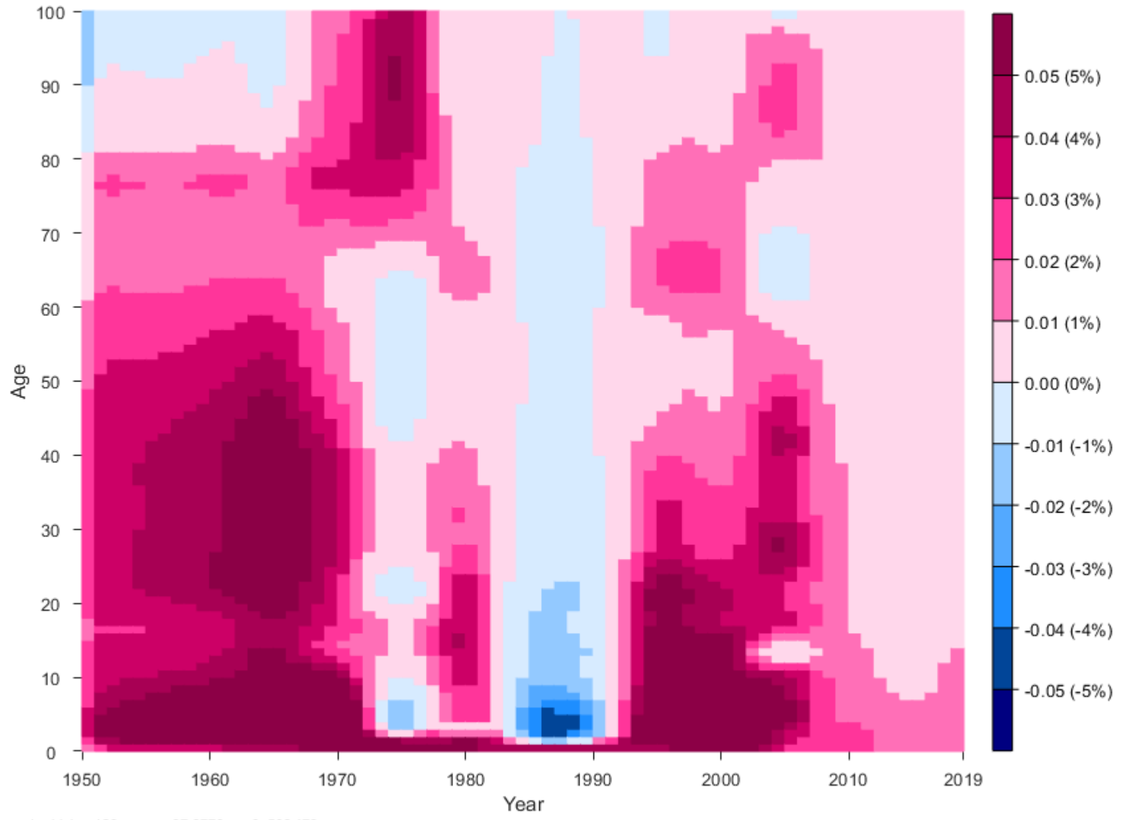
Females



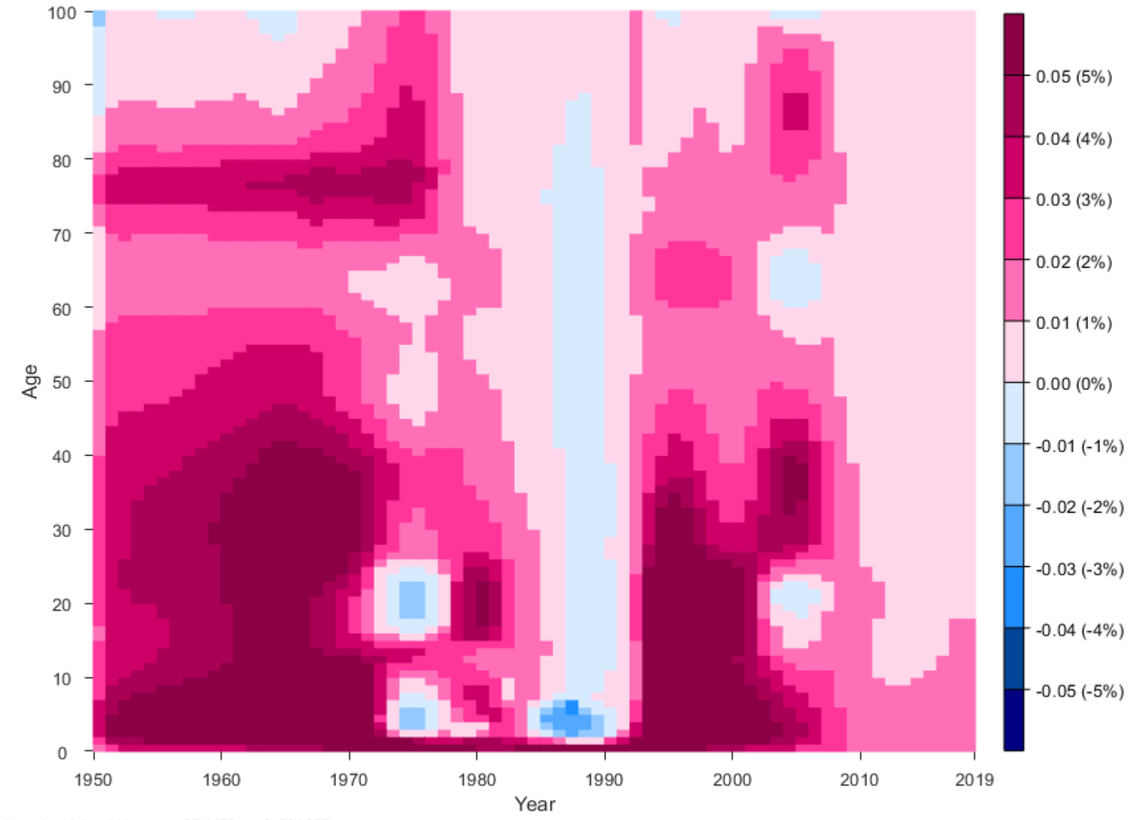
iters=4, nblobs=175, varprc=88.7229, var0=293.282

Cuba

Males

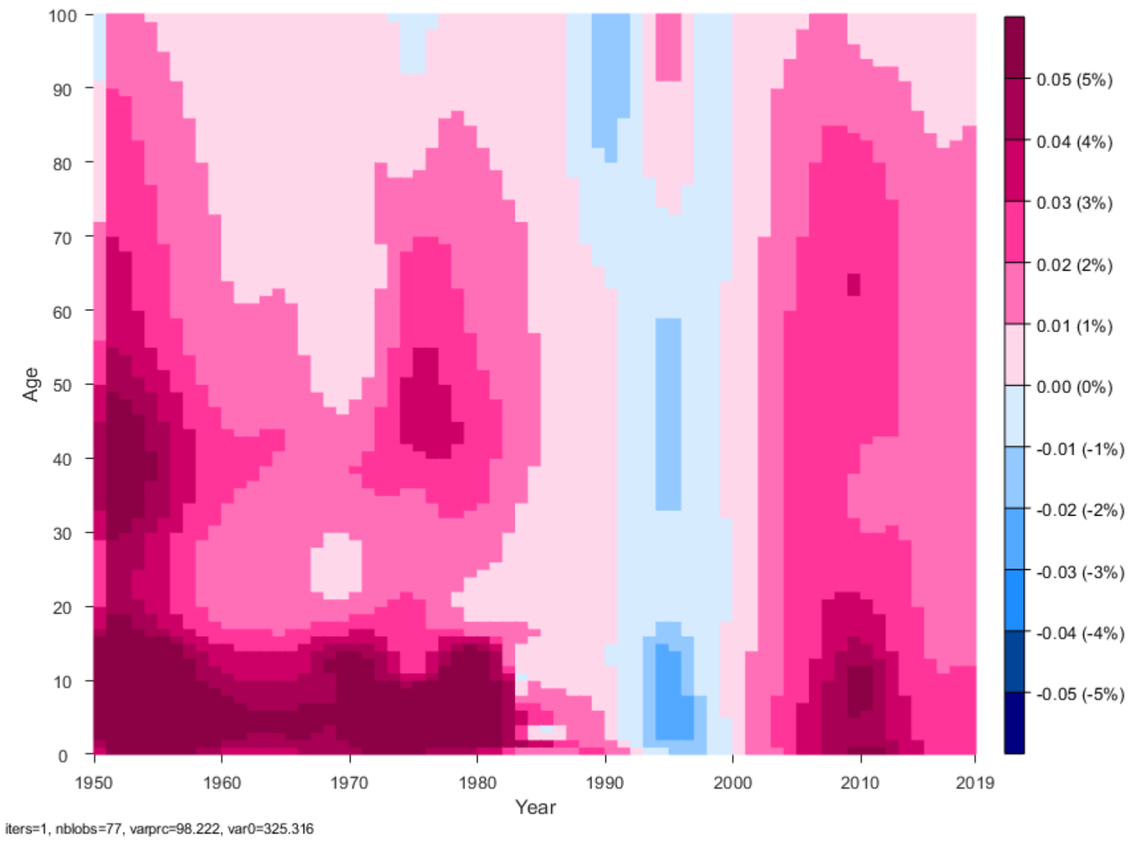


Females



Curaçao

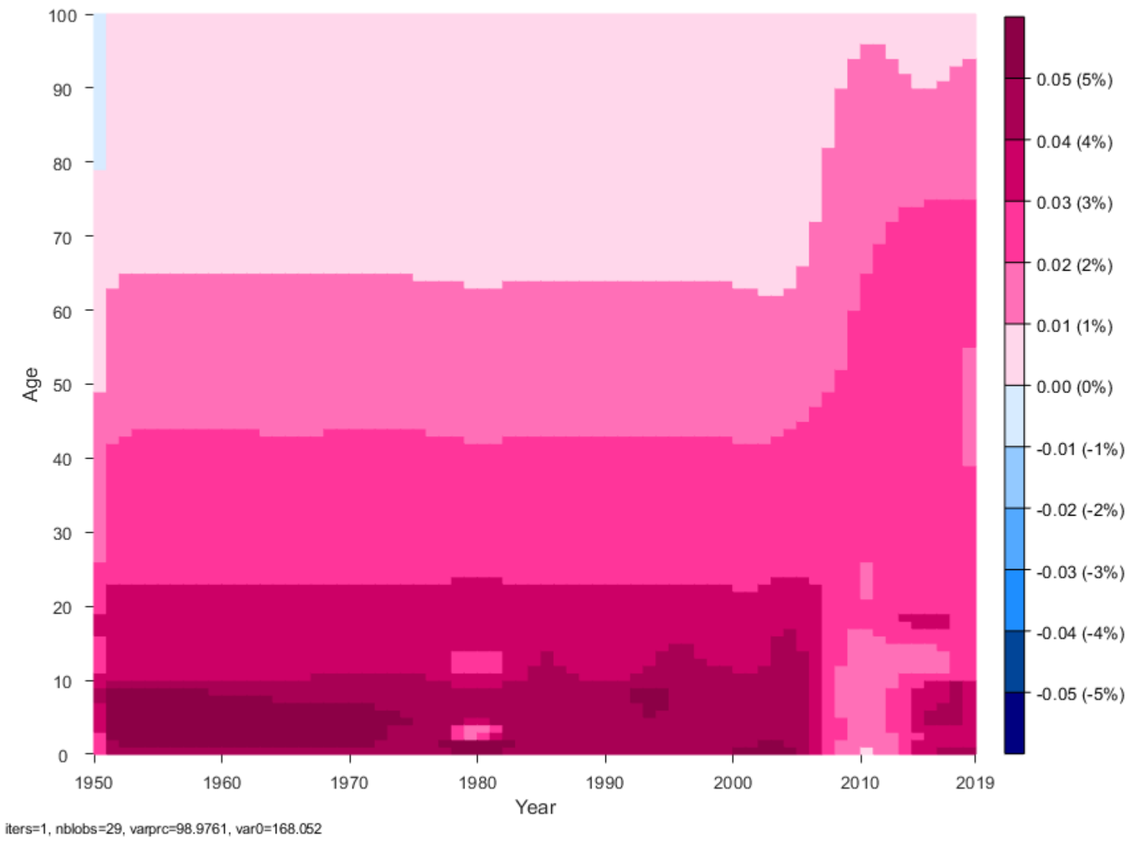
Males



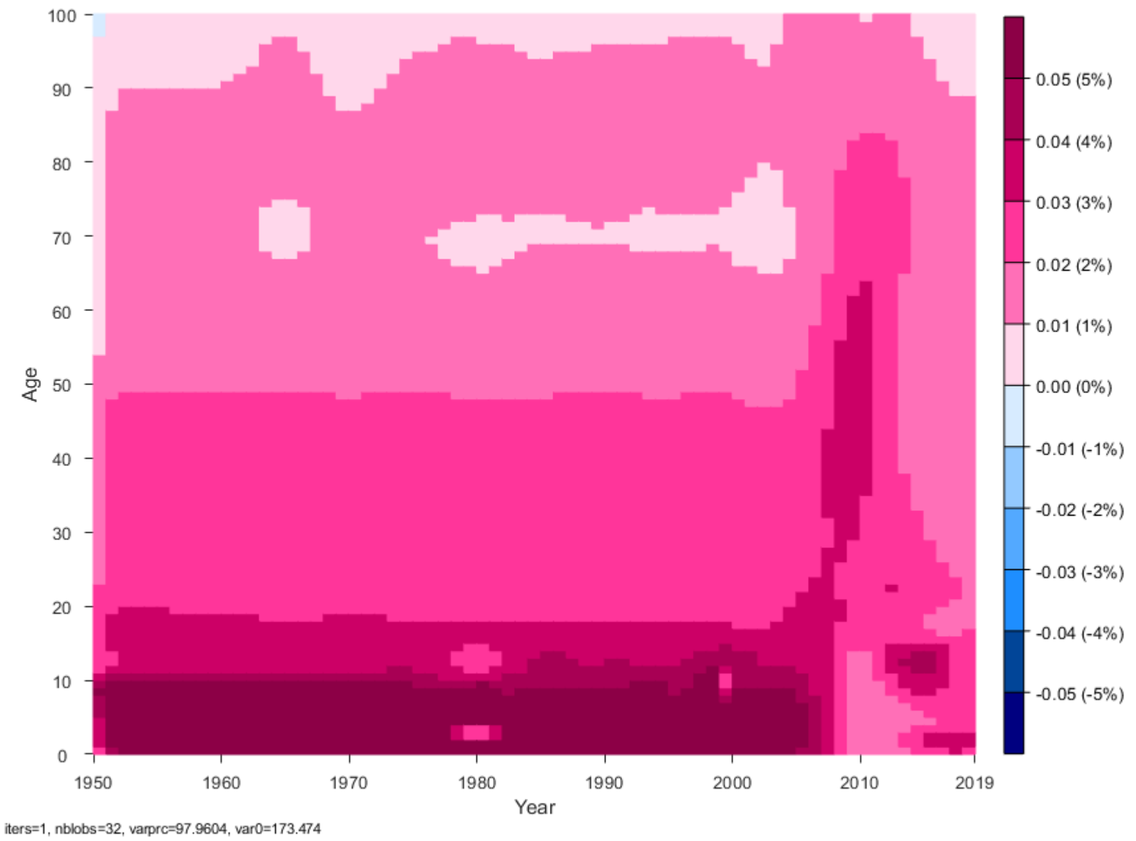
Females

Cyprus

Males

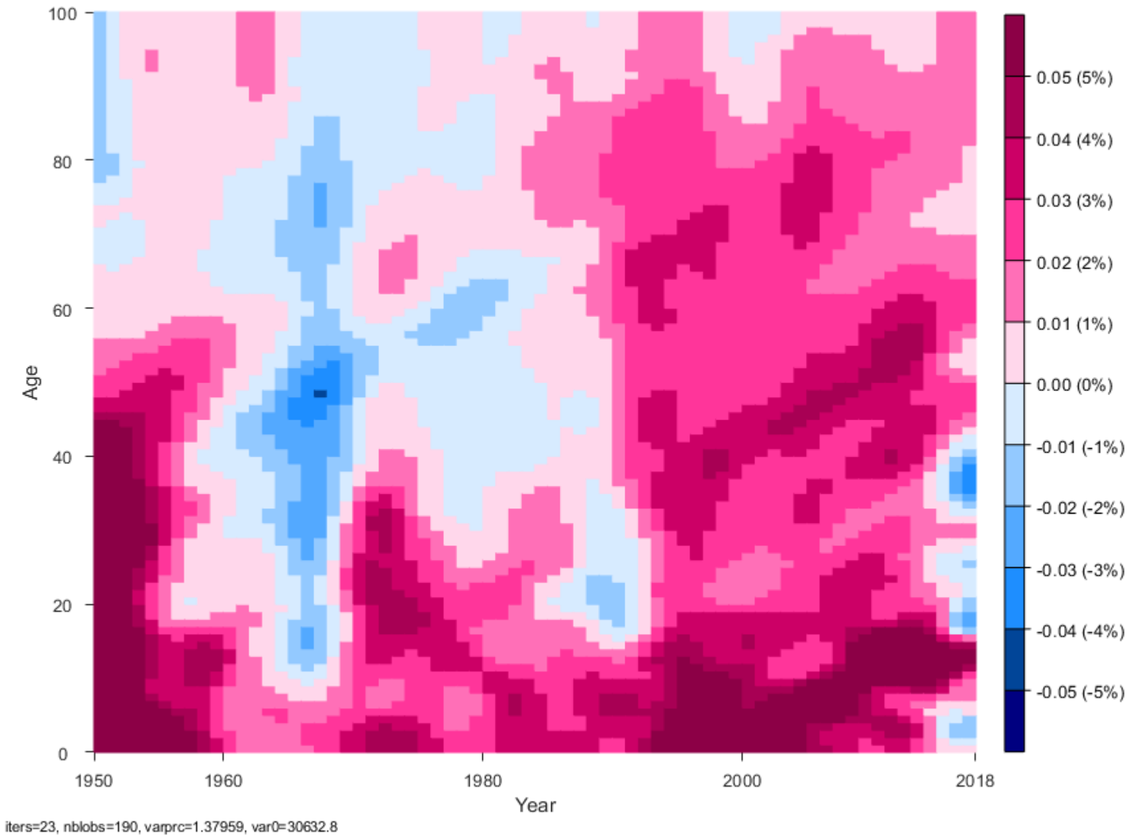


Females



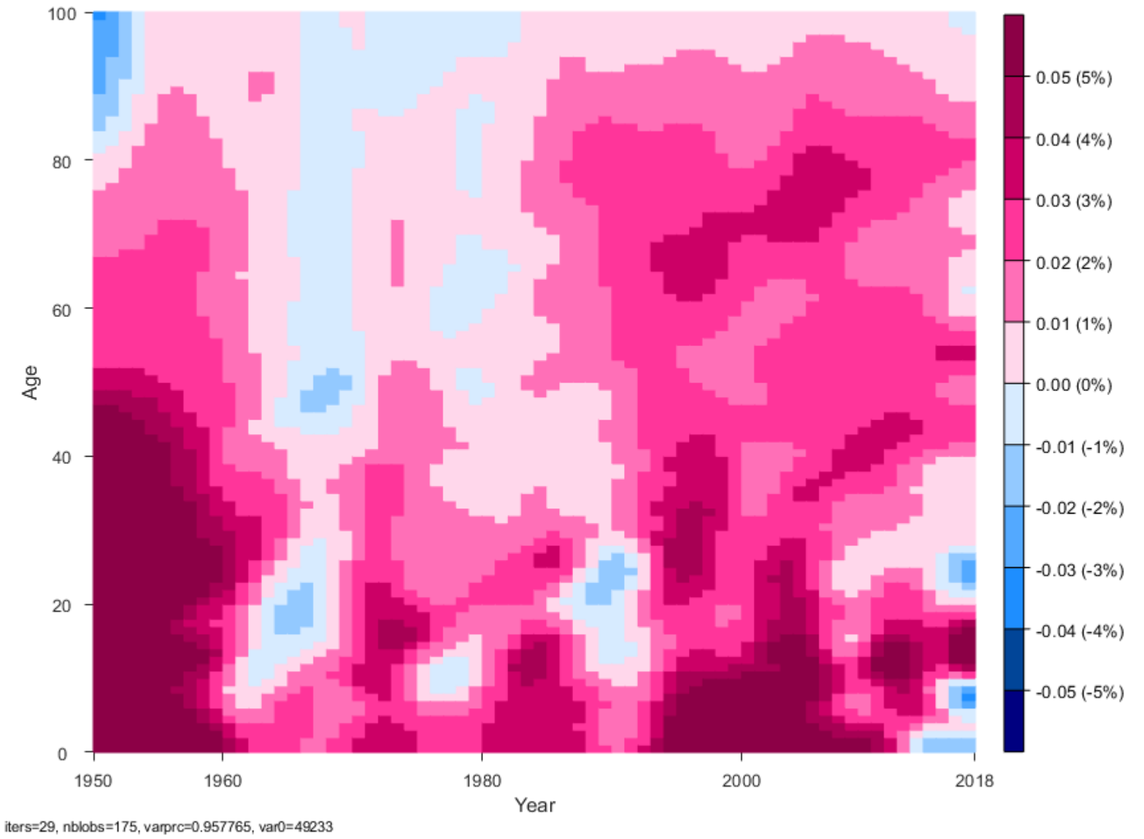
Czechia

Males



iters=23, nblobs=190, varprc=1.37959, var0=30632.8

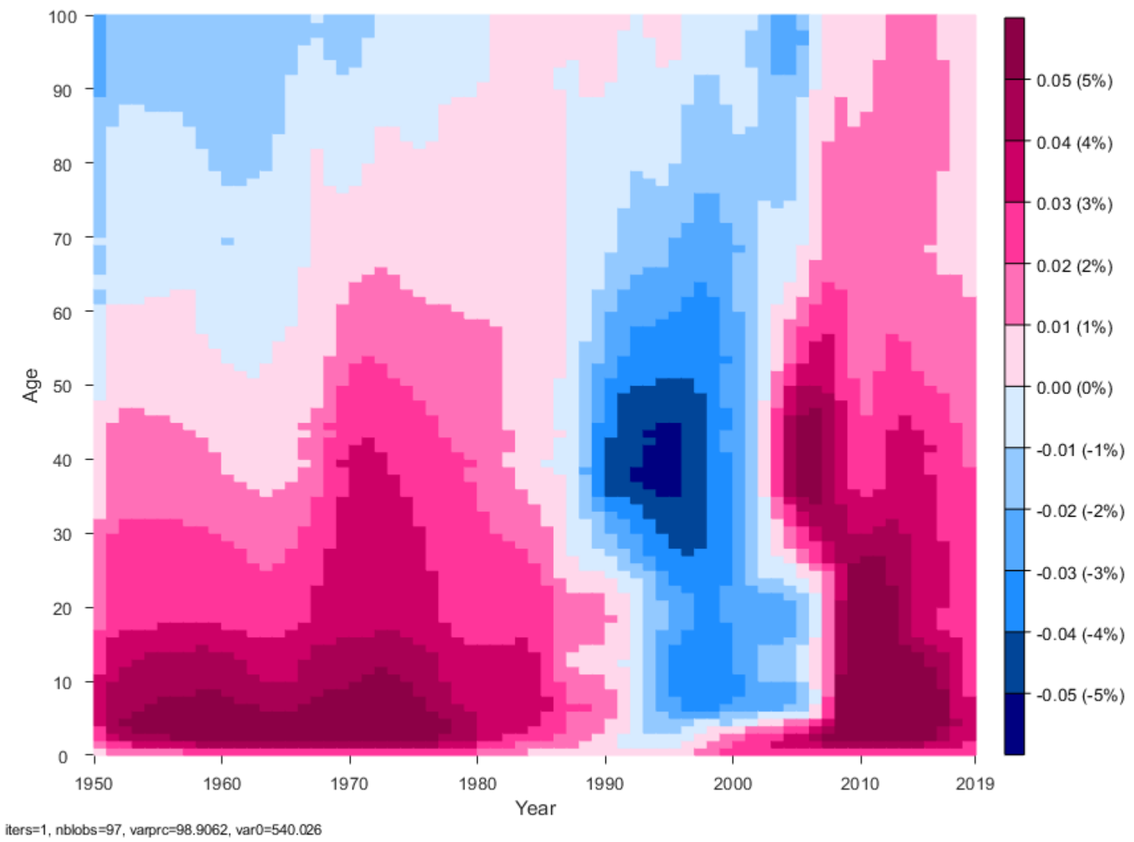
Females



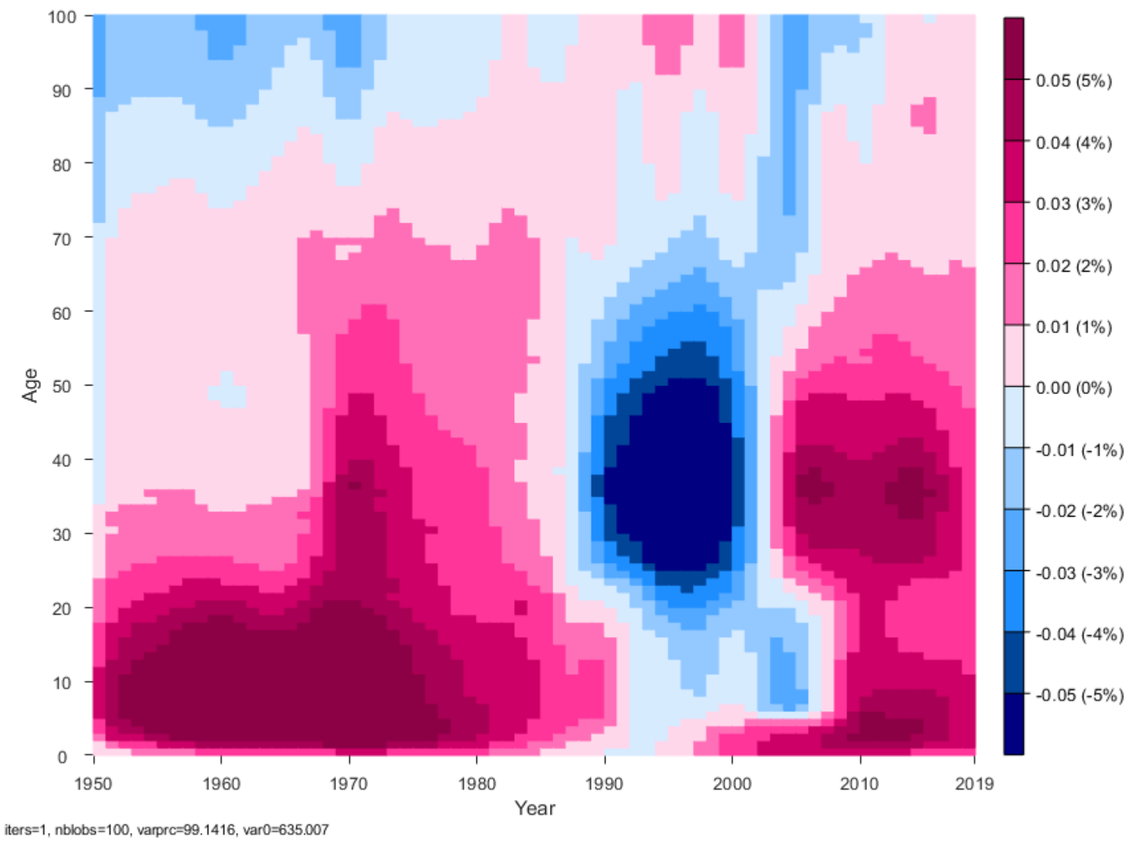
iters=29, nblobs=175, varprc=0.957765, var0=49233

Côte d'Ivoire

Males

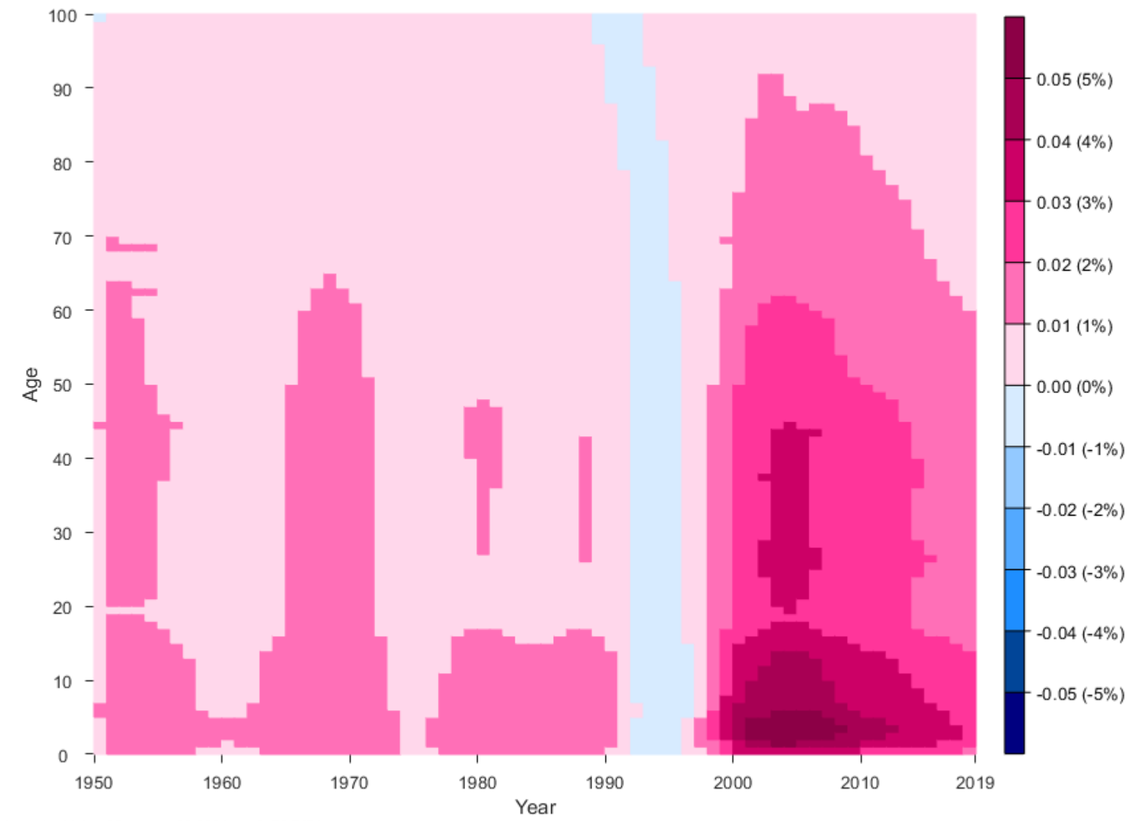


Females



Dem. Republic of the Congo

Males



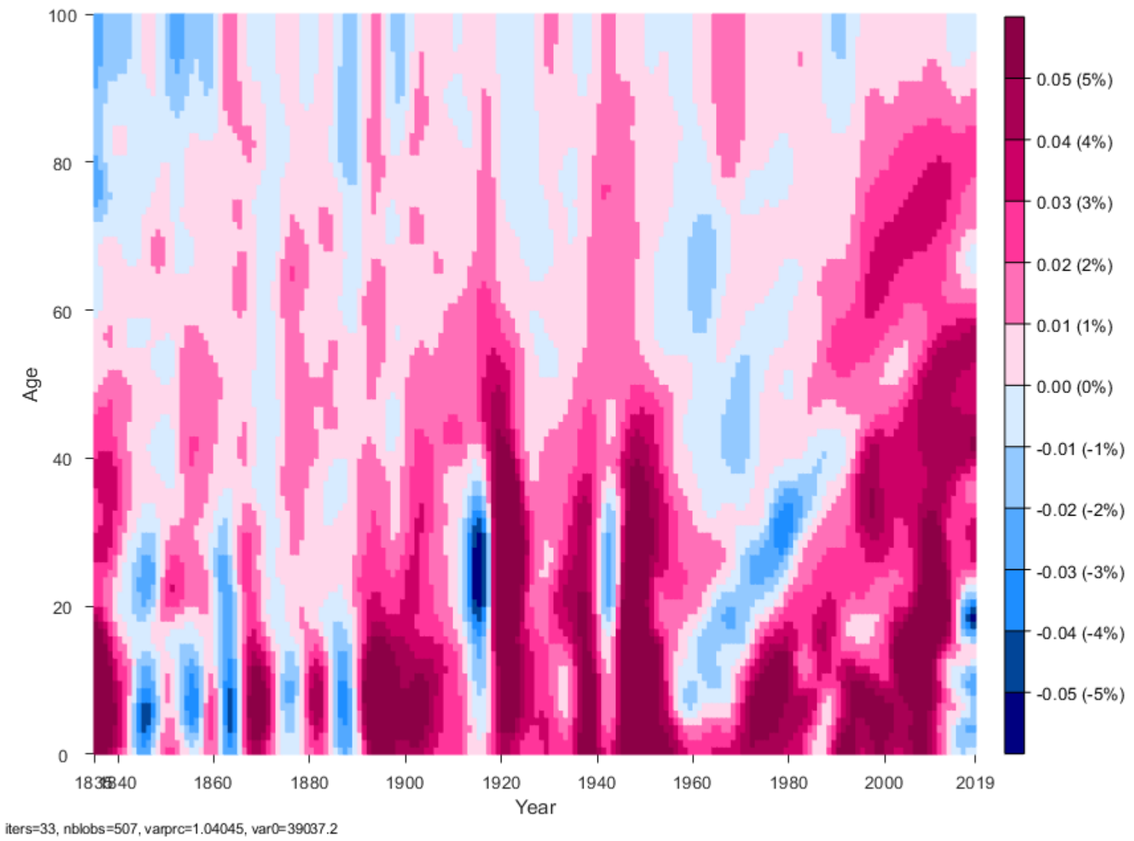
iters=1, nblobs=25, varprc=98.8324, var0=76.7474

Females

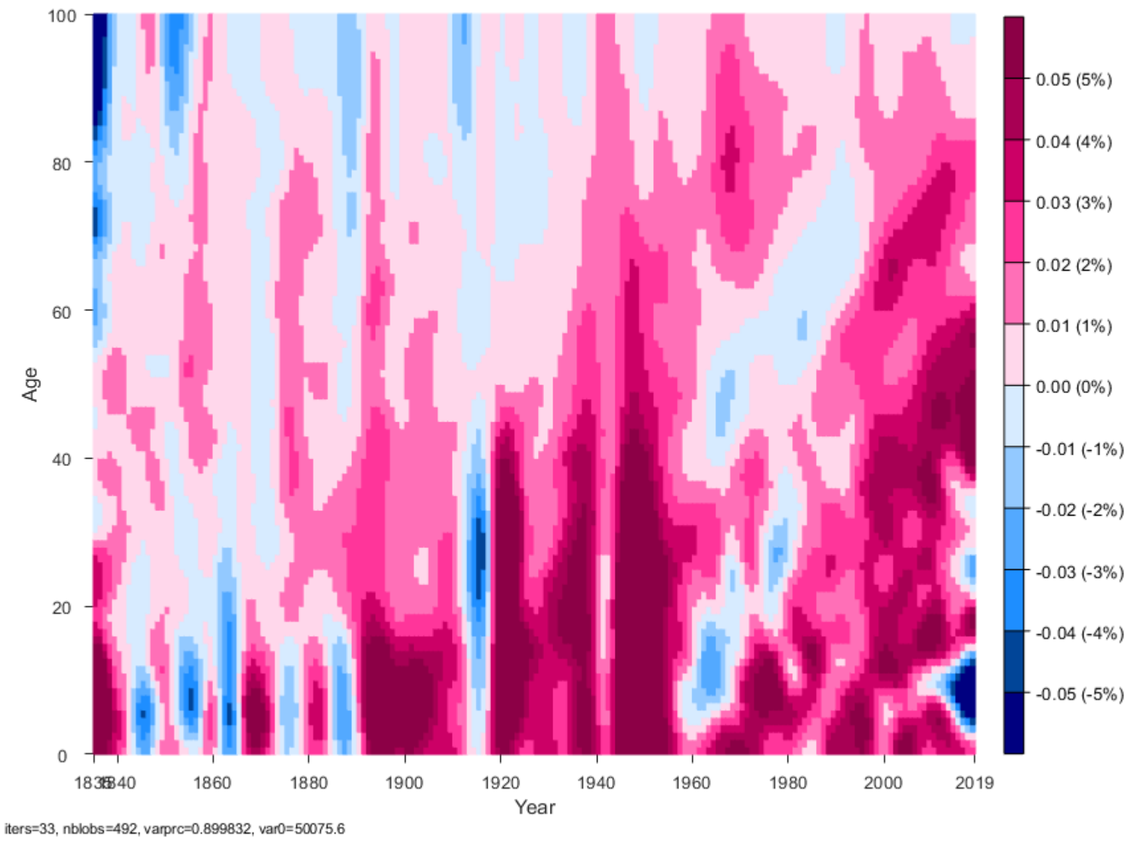
iters=1, nblobs=26, varprc=98.934, var0=95.0532

Denmark

Males

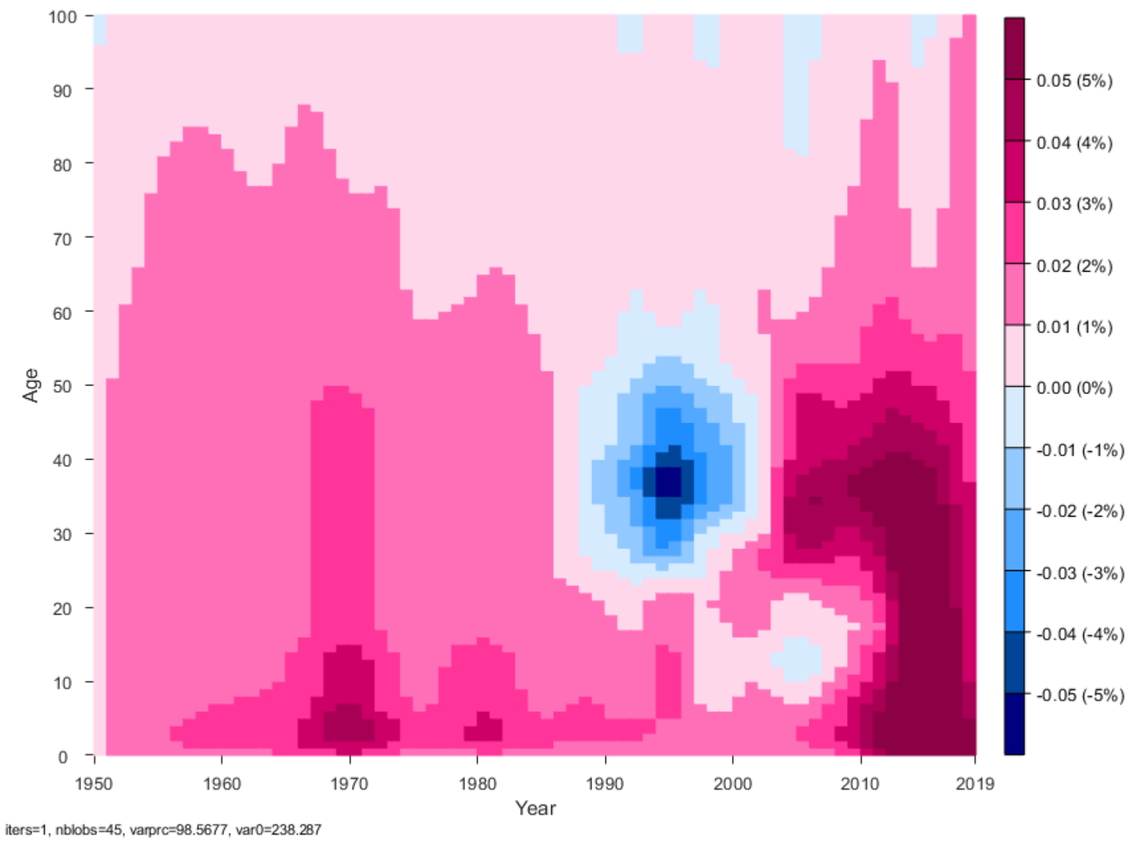


Females



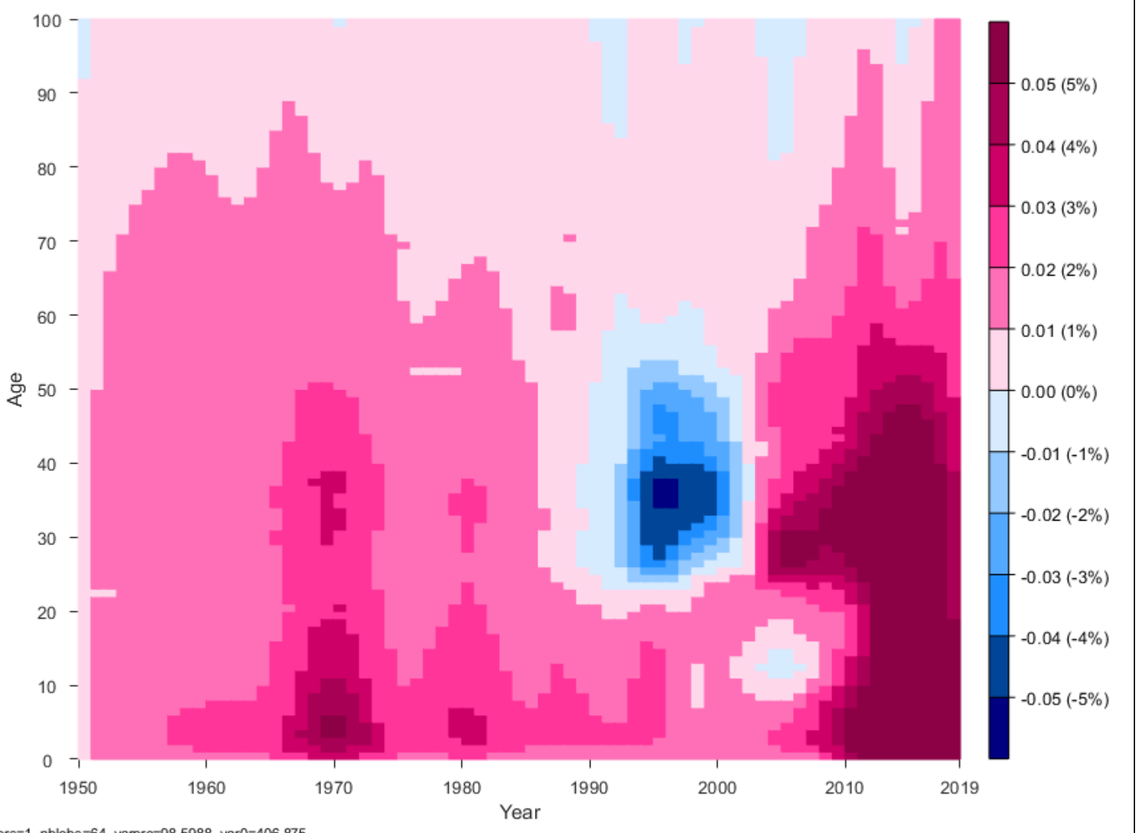
Djibouti

Males



iters=1, nblobs=45, varprc=98.5677, var0=238.287

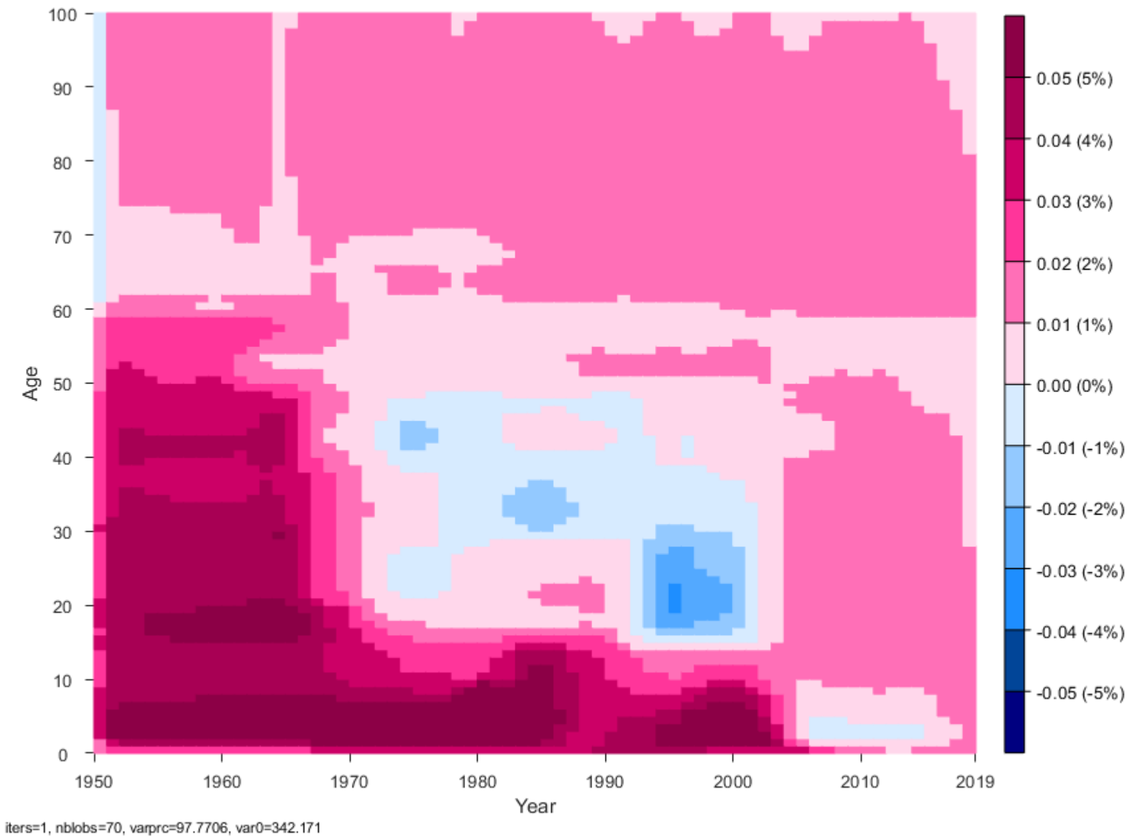
Females



iters=1, nblobs=64, varprc=98.5988, var0=406.875

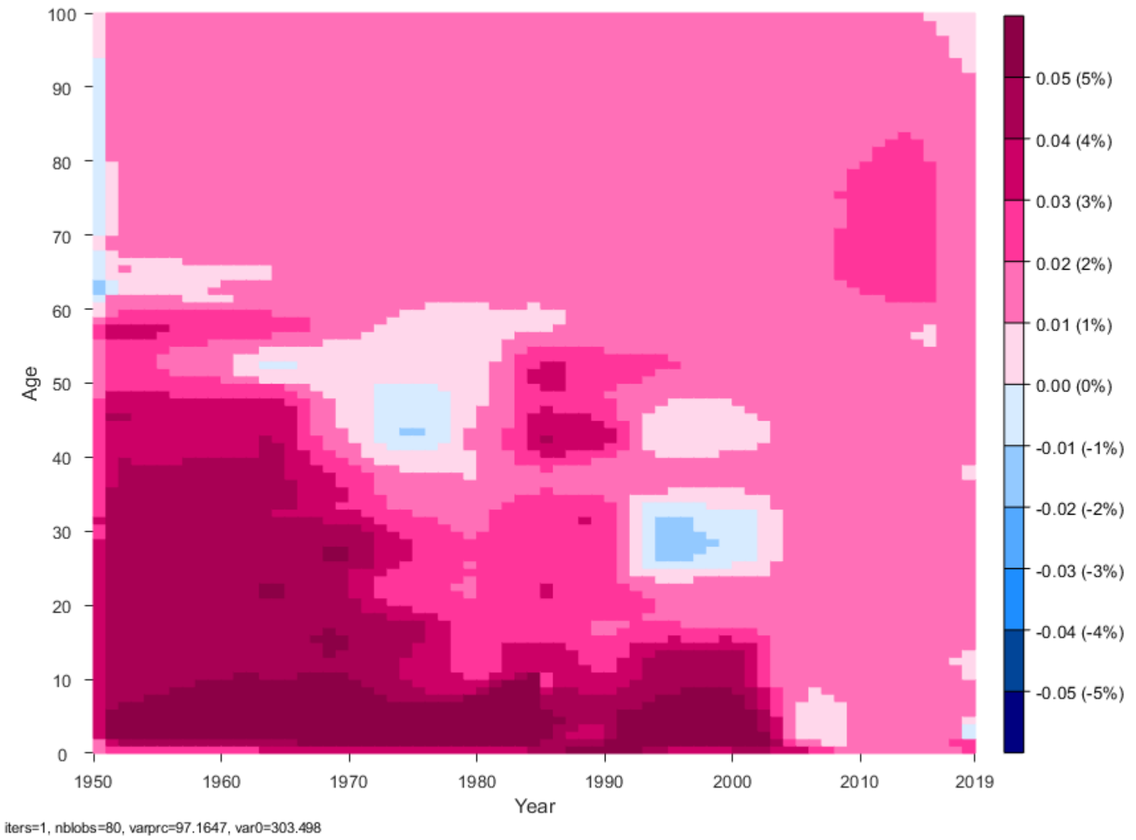
Dominican Republic

Males



iters=1, nblobs=70, varprc=97.7706, var0=342.171

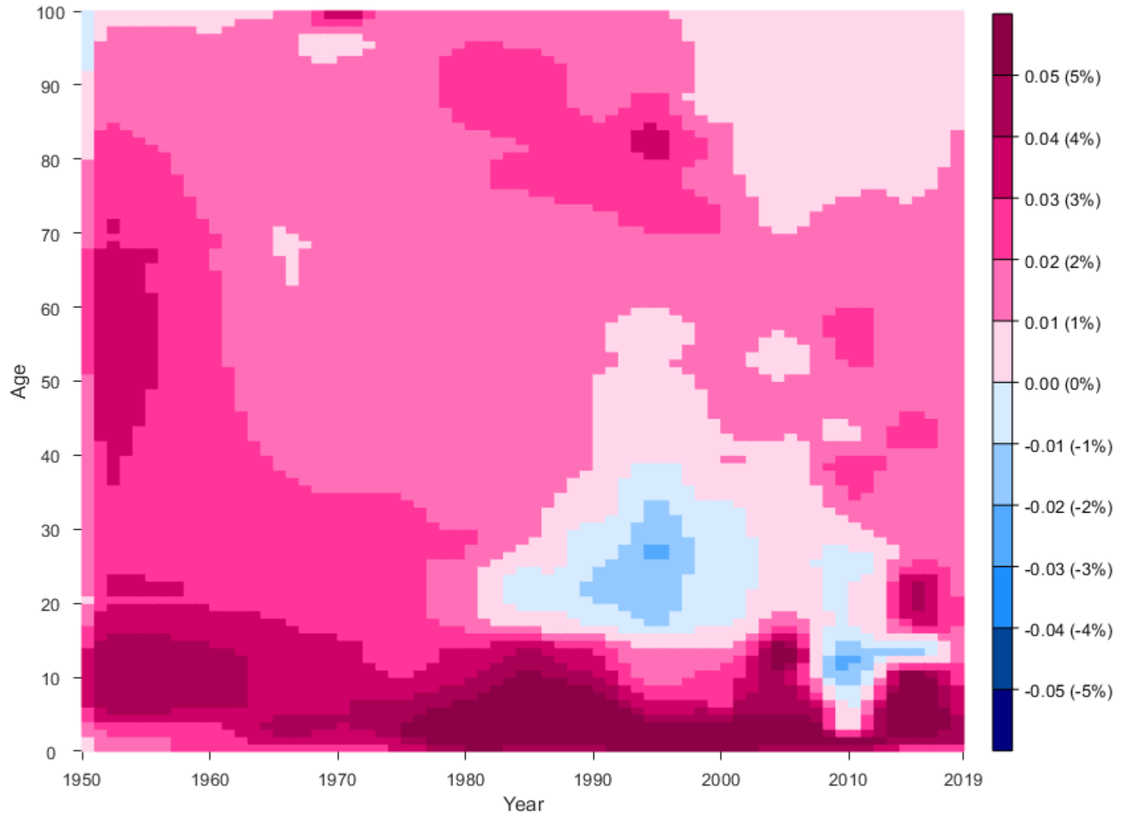
Females



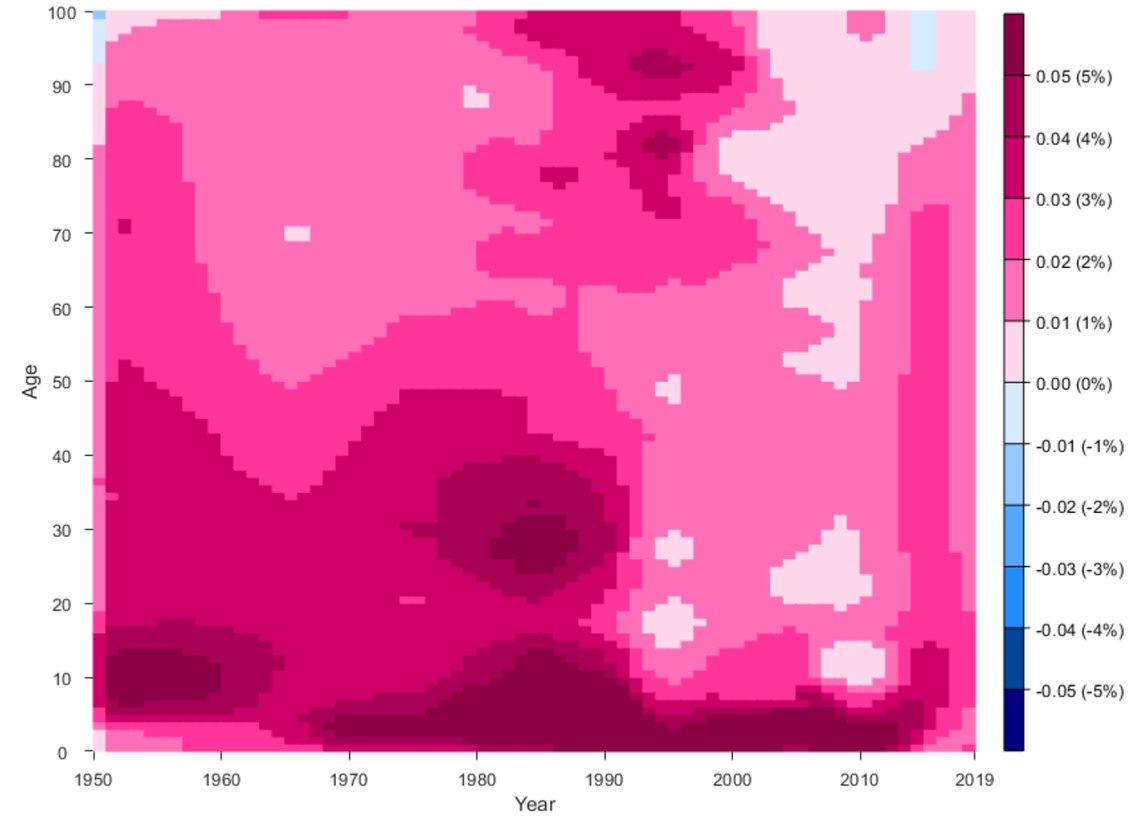
iters=1, nblobs=80, varprc=97.1647, var0=303.498

Ecuador

Males

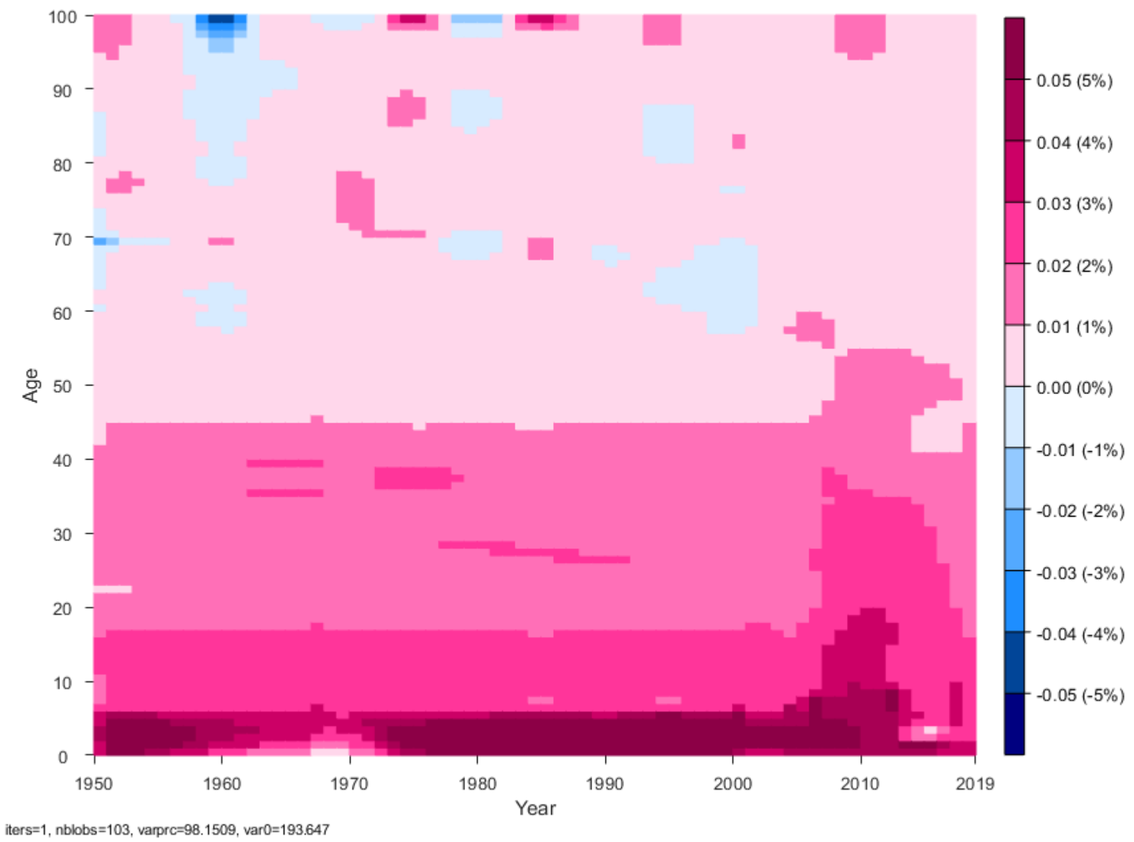


Females



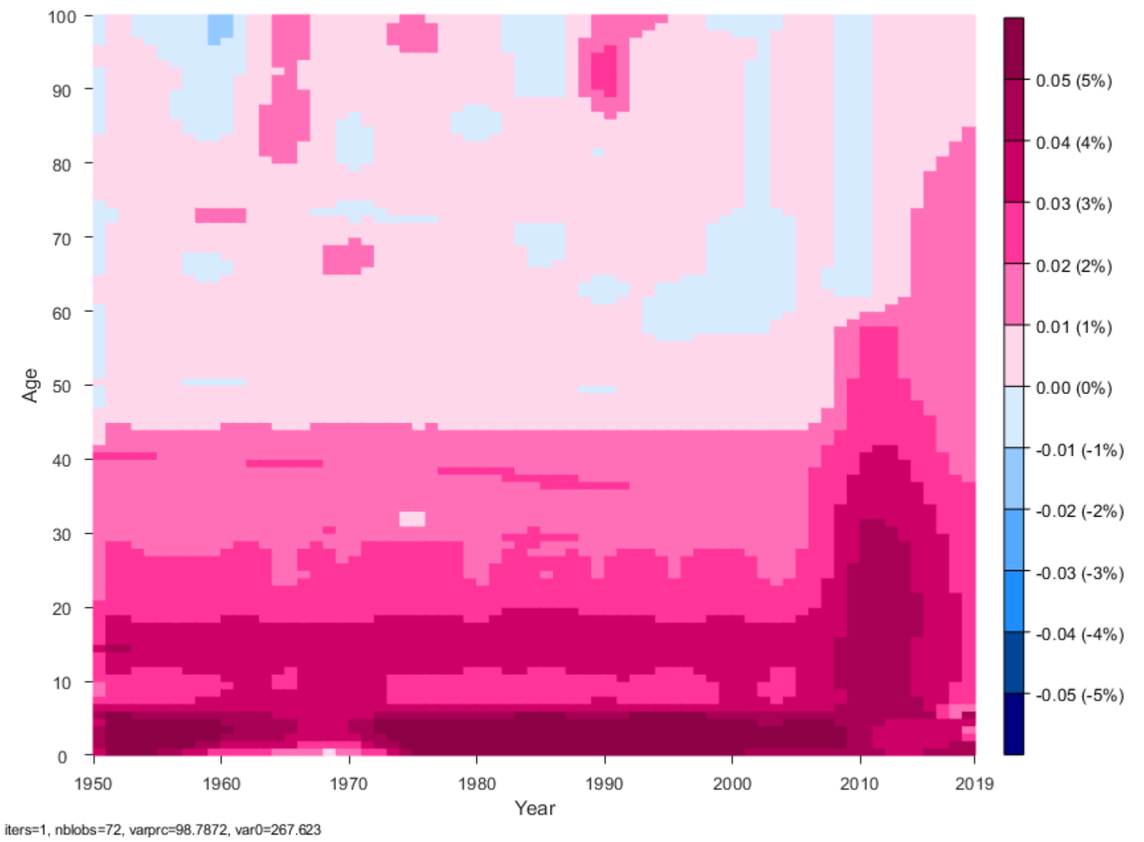
Egypt

Males



iters=1, nblobs=103, varprc=98.1509, var0=193.647

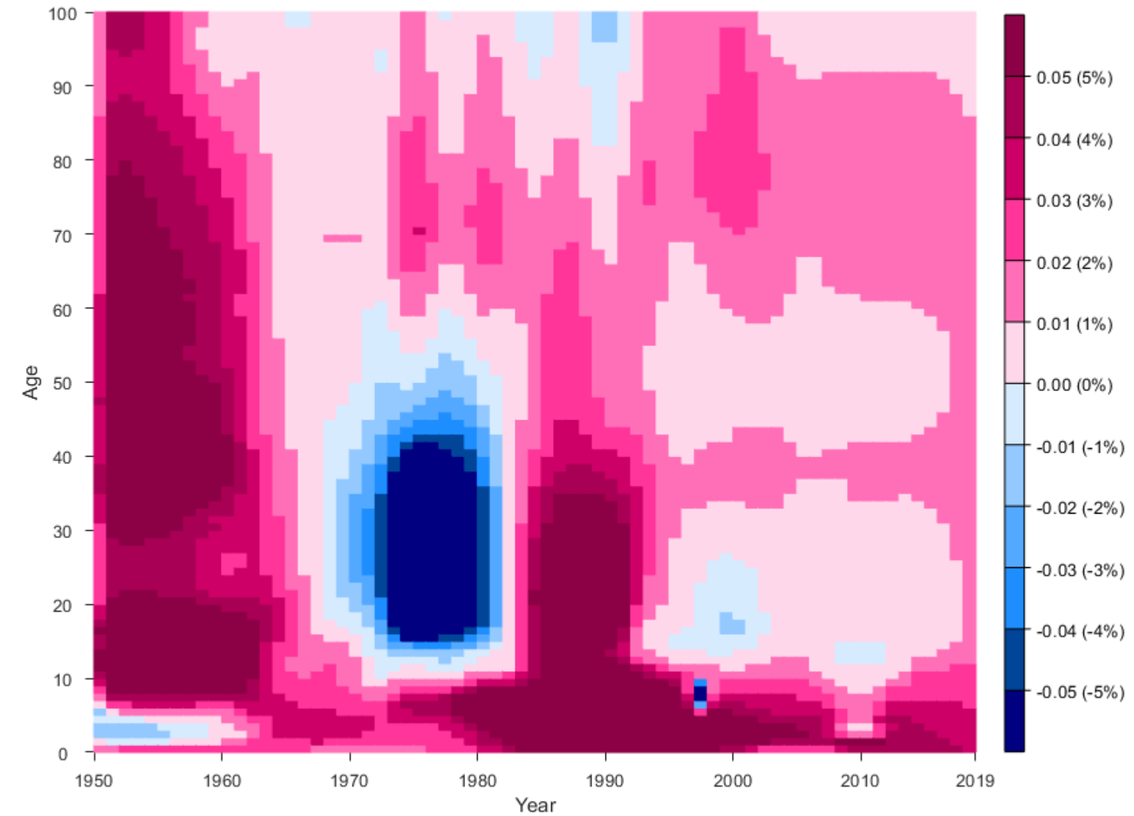
Females



iters=1, nblobs=72, varprc=98.7872, var0=267.623

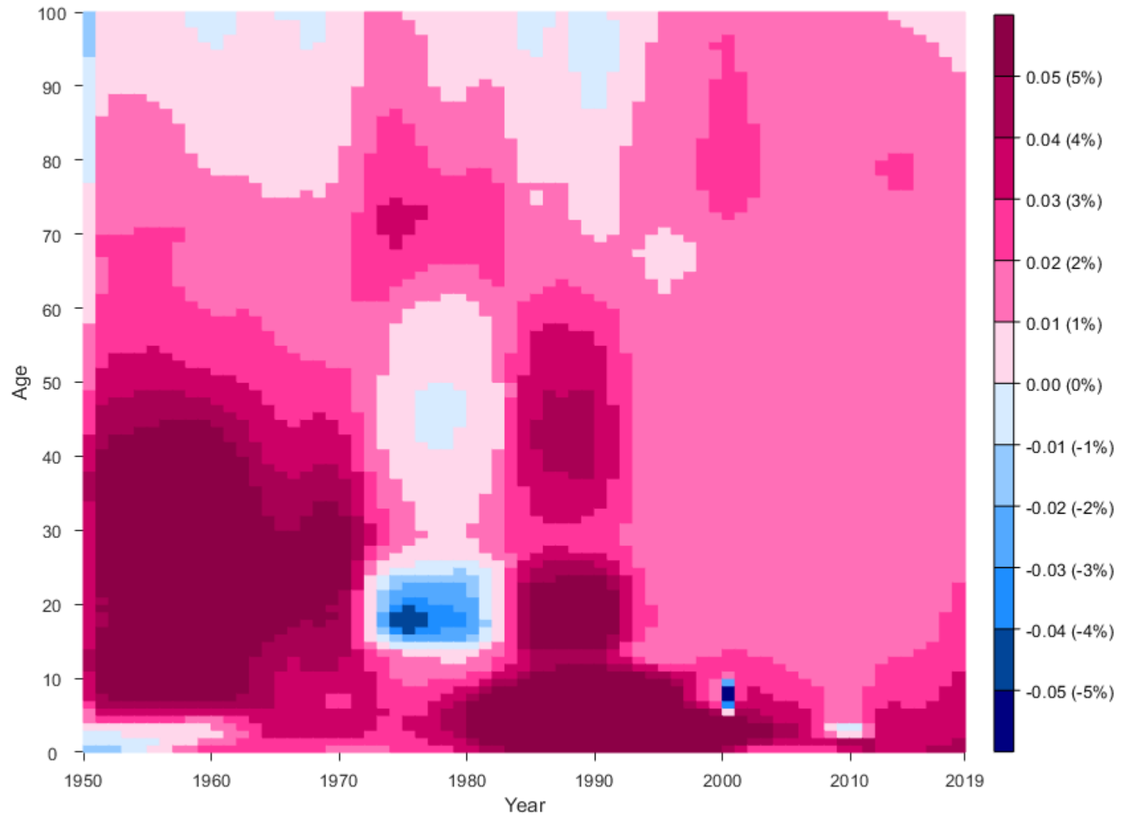
El Salvador

Males



iters=1, nblobs=174, varprc=97.9121, var0=889.648

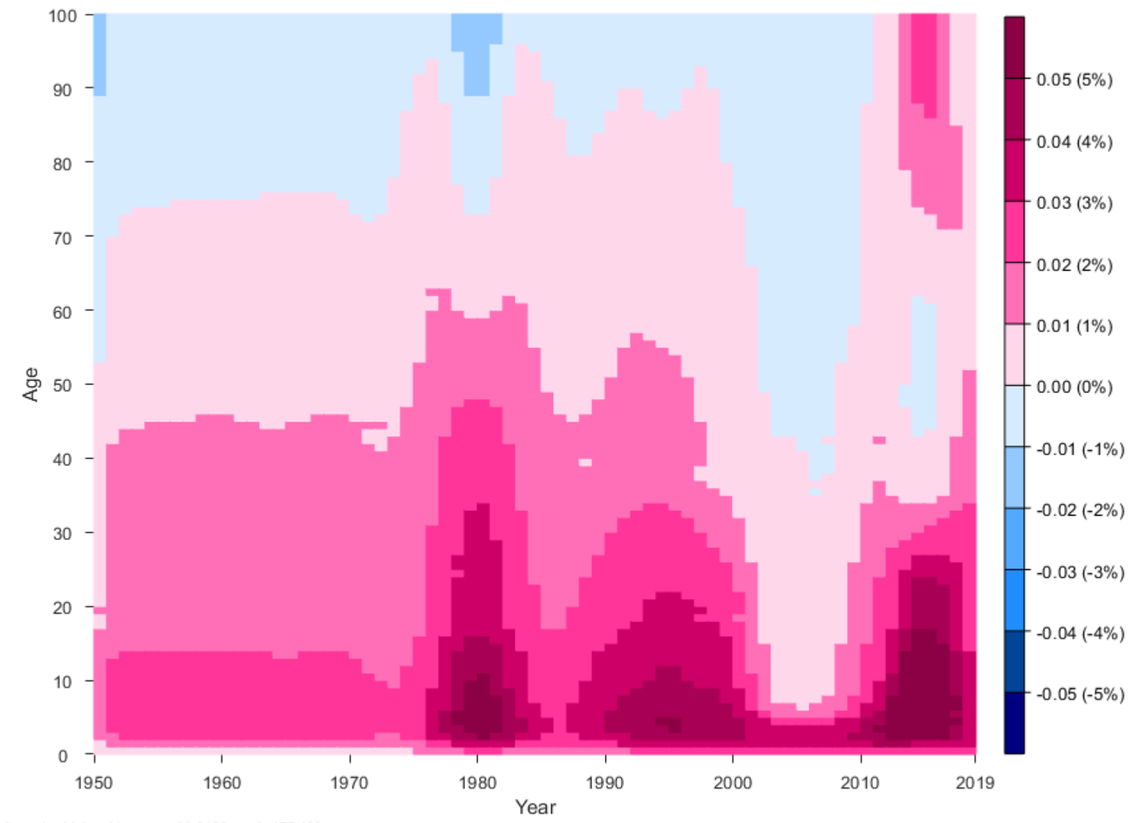
Females



iters=1, nblobs=137, varprc=97.8423, var0=538.498

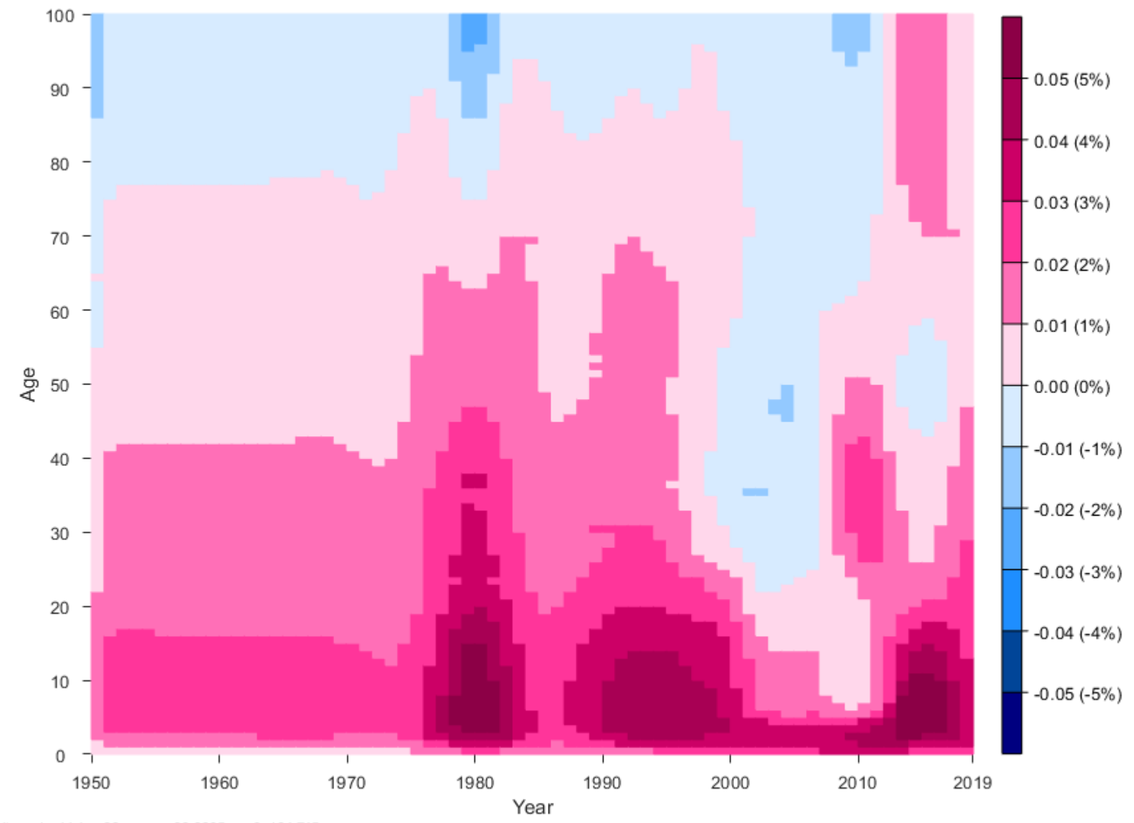
Equatorial Guinea

Males



iters=1, nblobs=41, varprc=98.6425, var0=177.163

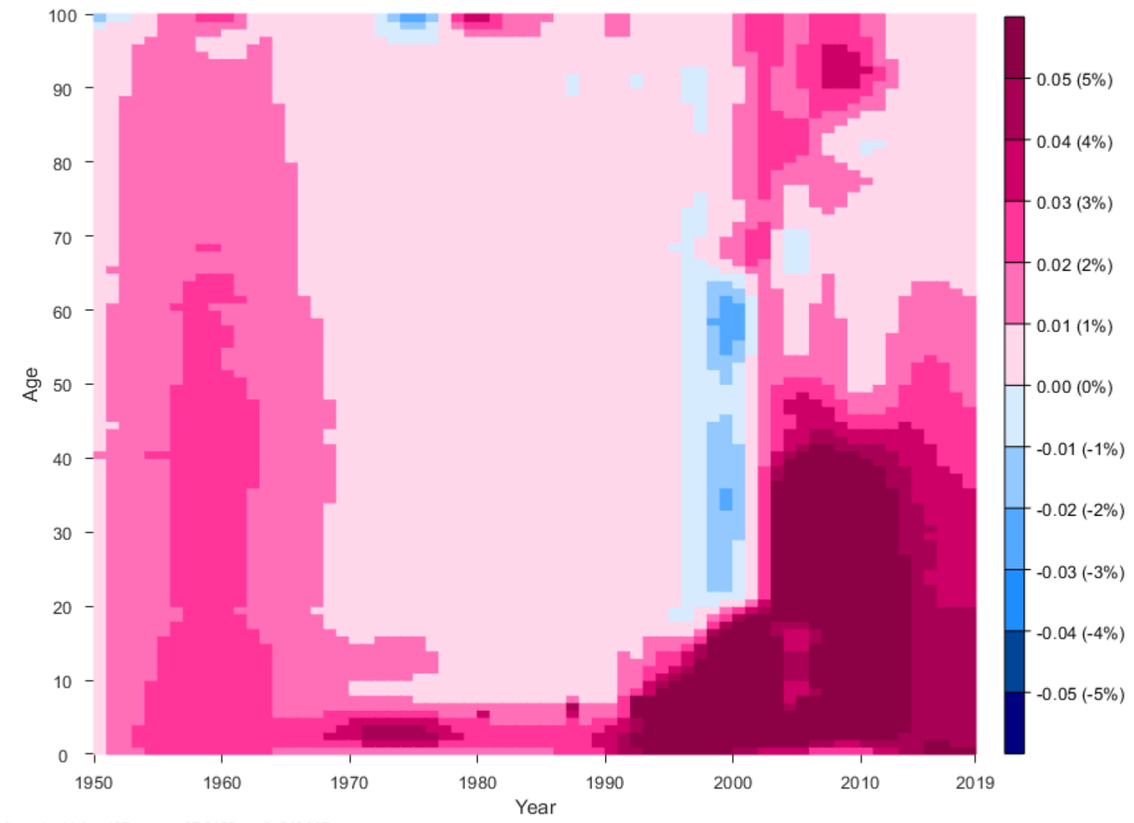
Females



iters=1, nblobs=36, varprc=98.6605, var0=164.745

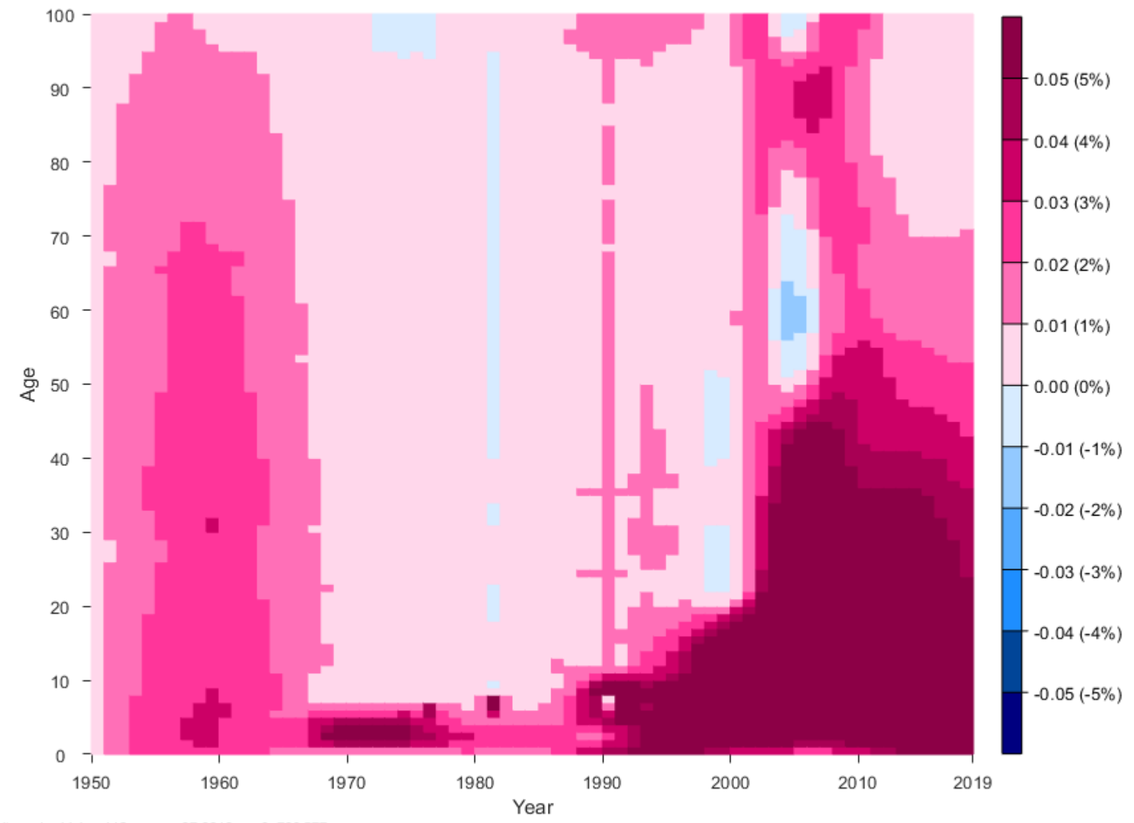
Eritrea

Males



iters=1, nblobs=107, varprc=97.6153, var0=543.907

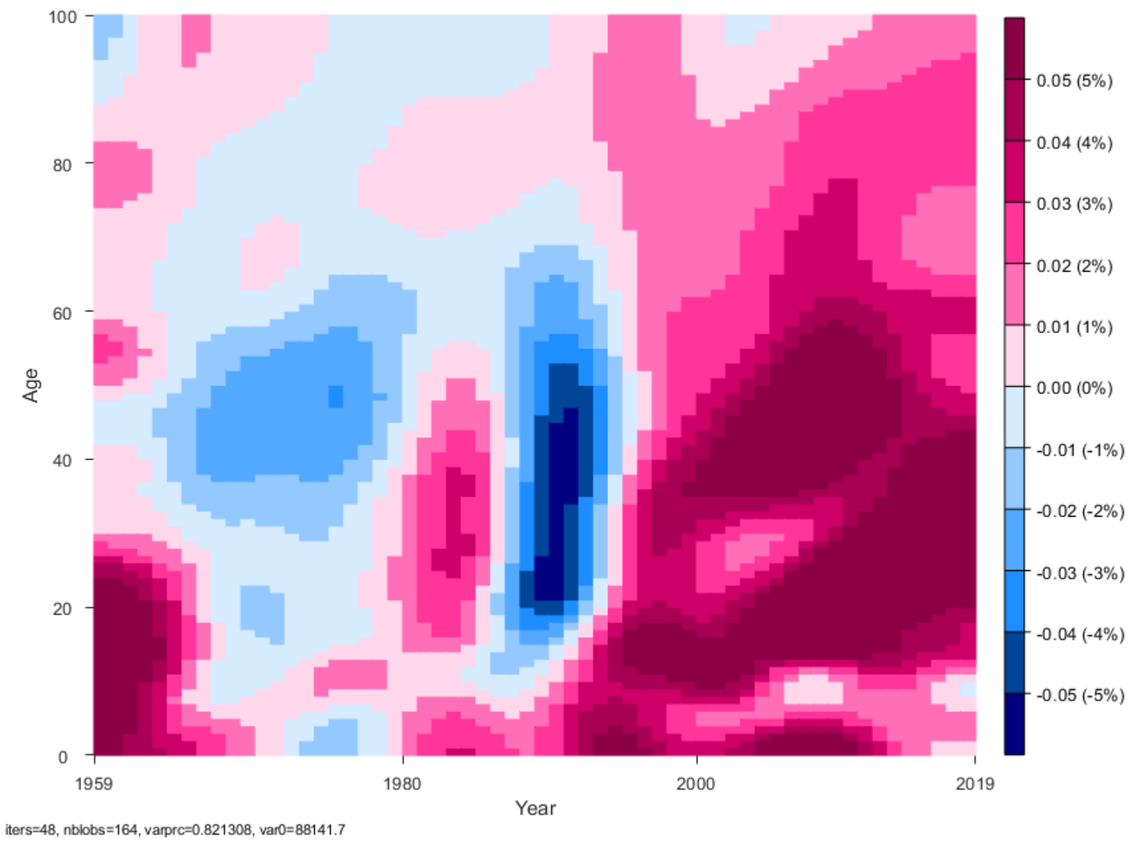
Females



iters=1, nblobs=112, varprc=97.8819, var0=733.577

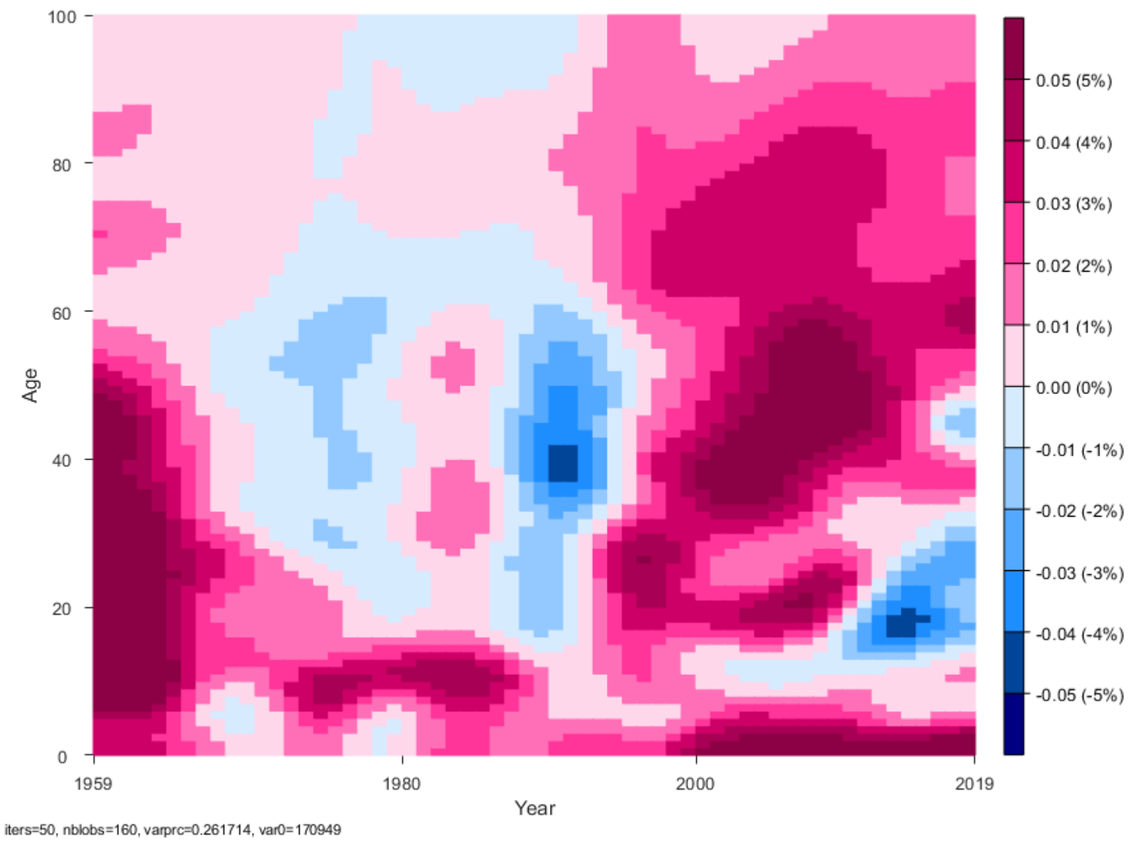
Estonia

Males



iters=48, nblobs=164, varprc=0.821308, var0=88141.7

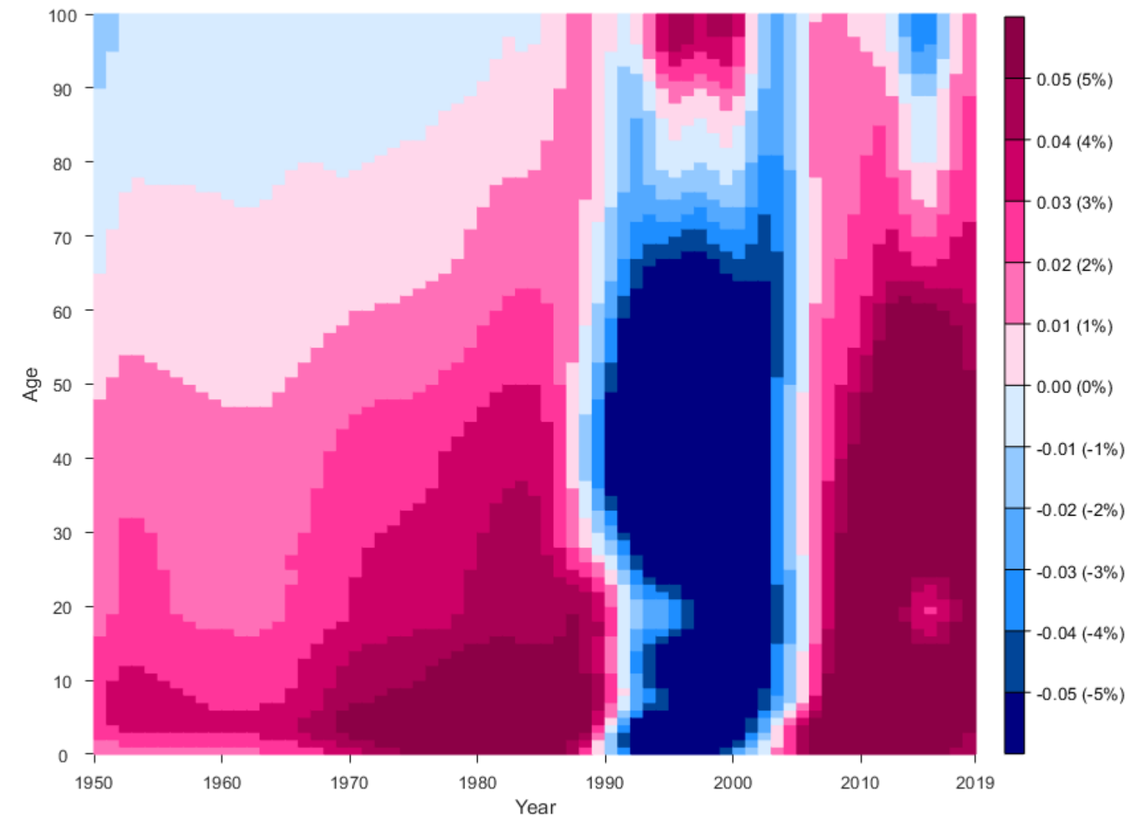
Females



iters=50, nblobs=160, varprc=0.261714, var0=170949

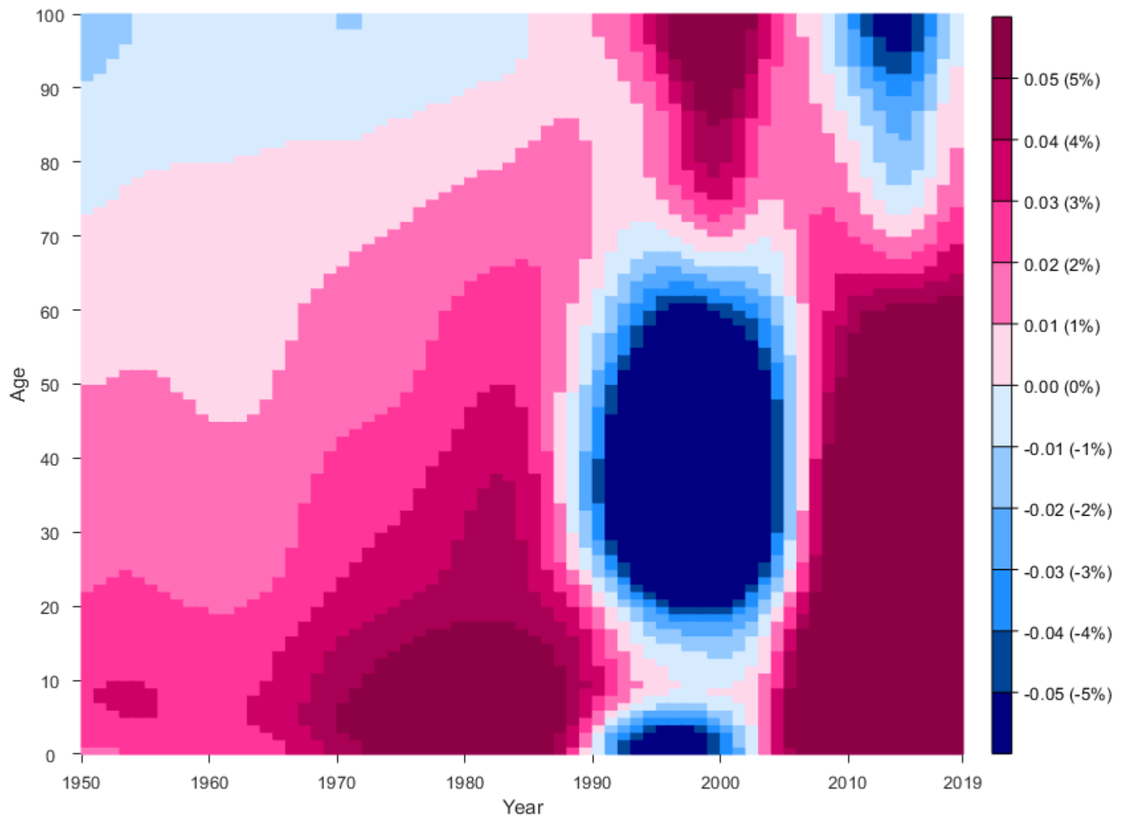
Eswatini

Males



iters=7, nblobs=190, varprc=92.5583, var0=2262.4

Females



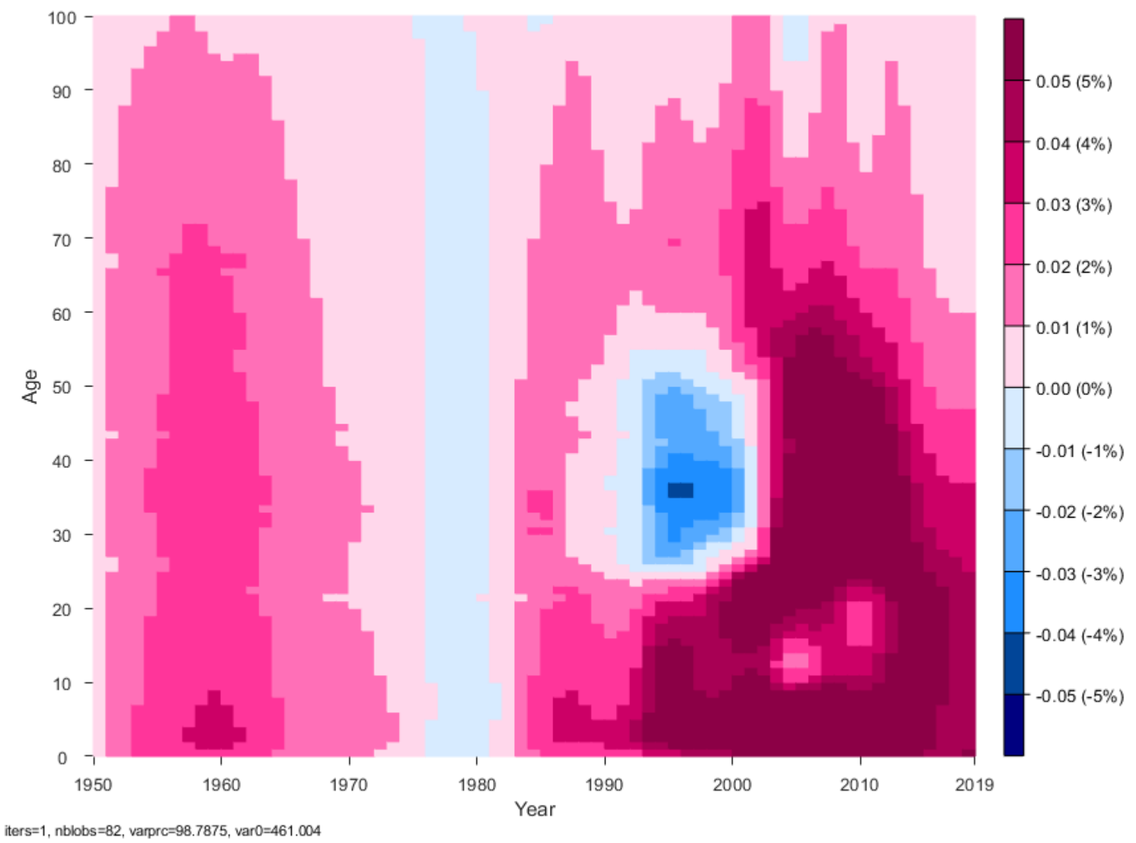
iters=27, nblobs=193, varprc=77.2449, var0=2840.7

Ethiopia

Males

iters=1, nblobs=59, varprc=98.7654, var0=292.581

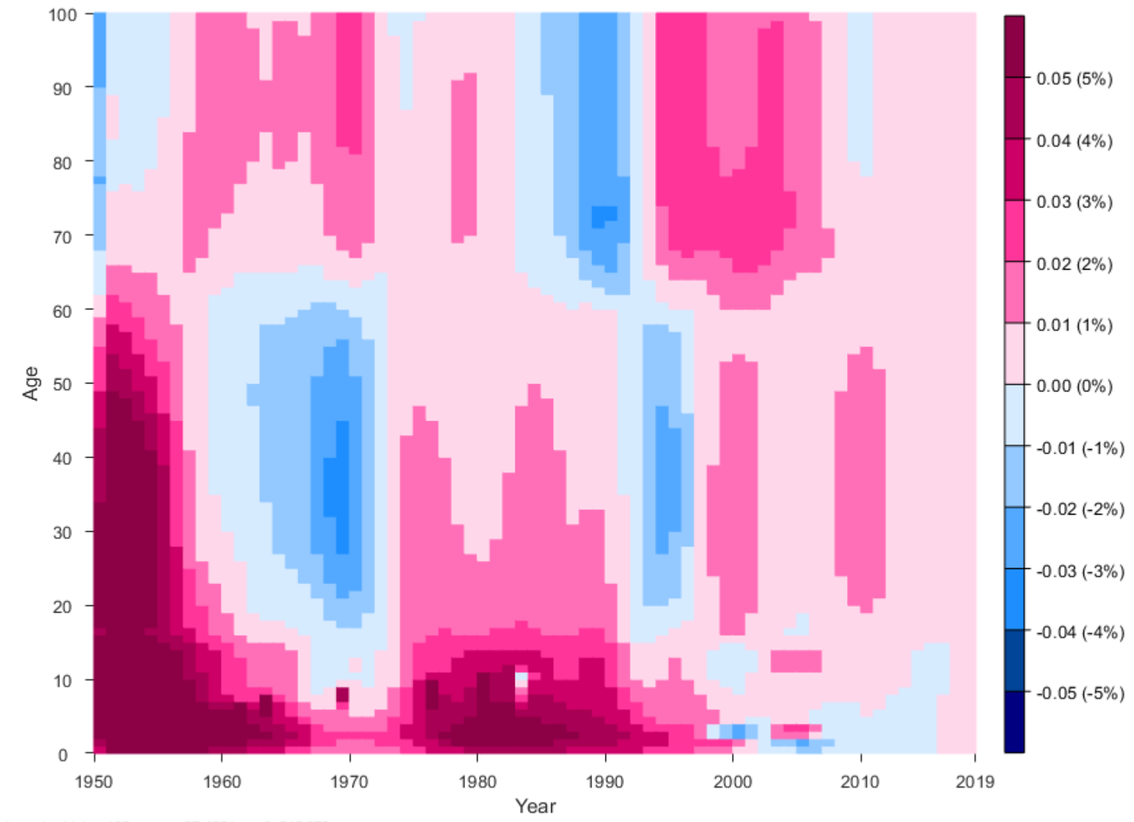
Females



iters=1, nblobs=82, varprc=98.7875, var0=461.004

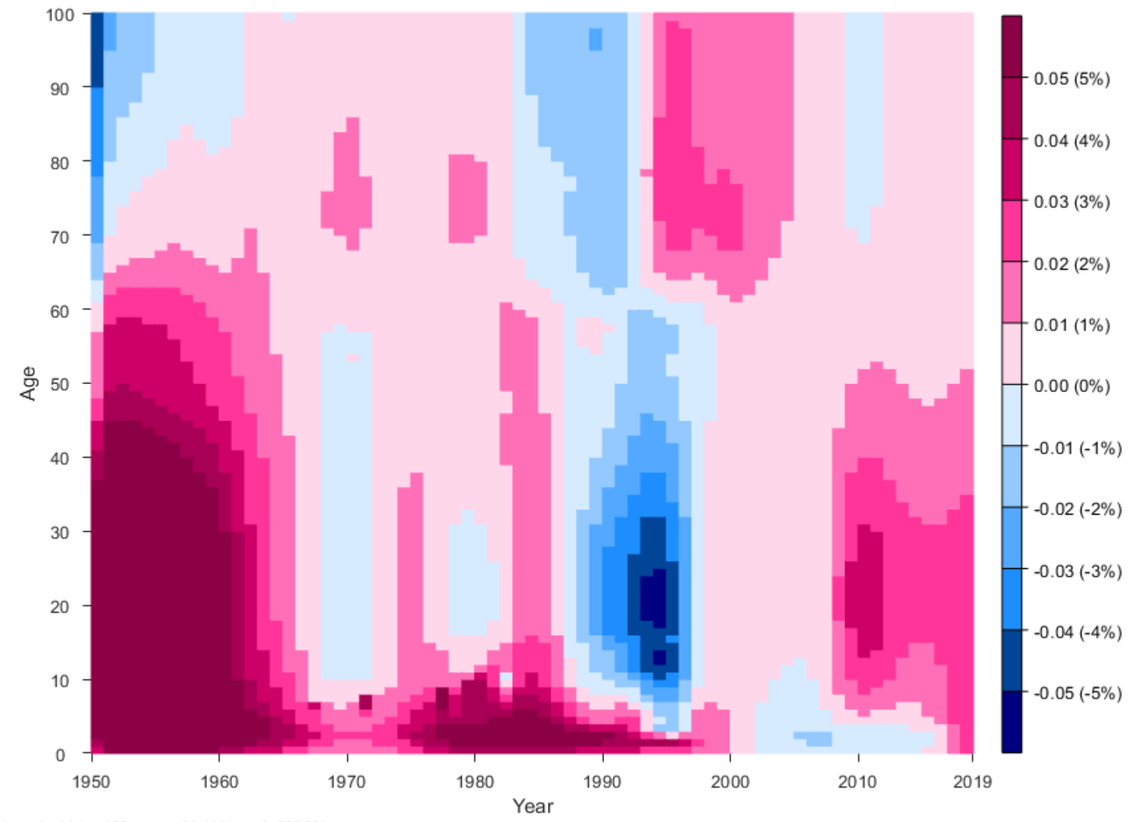
Fiji

Males



iters=1, nblobs=105, varprc=97.4351, var0=349.673

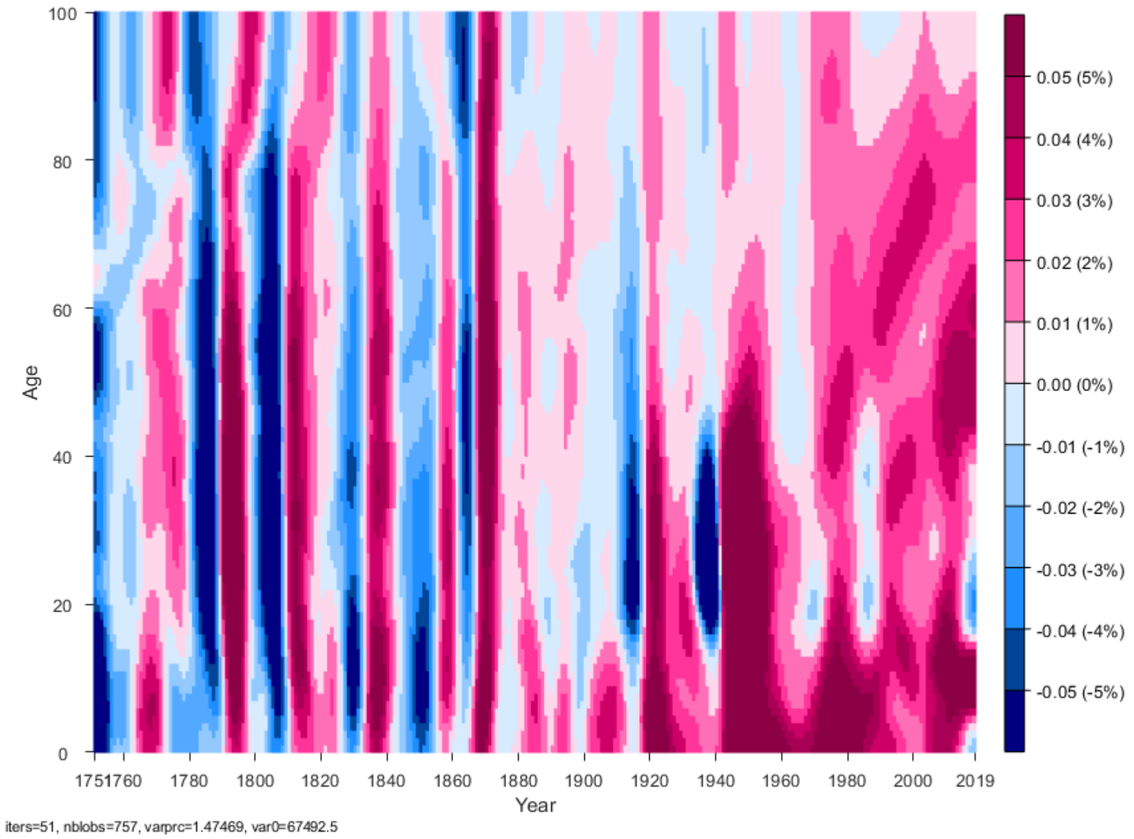
Females



iters=1, nblobs=125, varprc=98.4441, var0=525.599

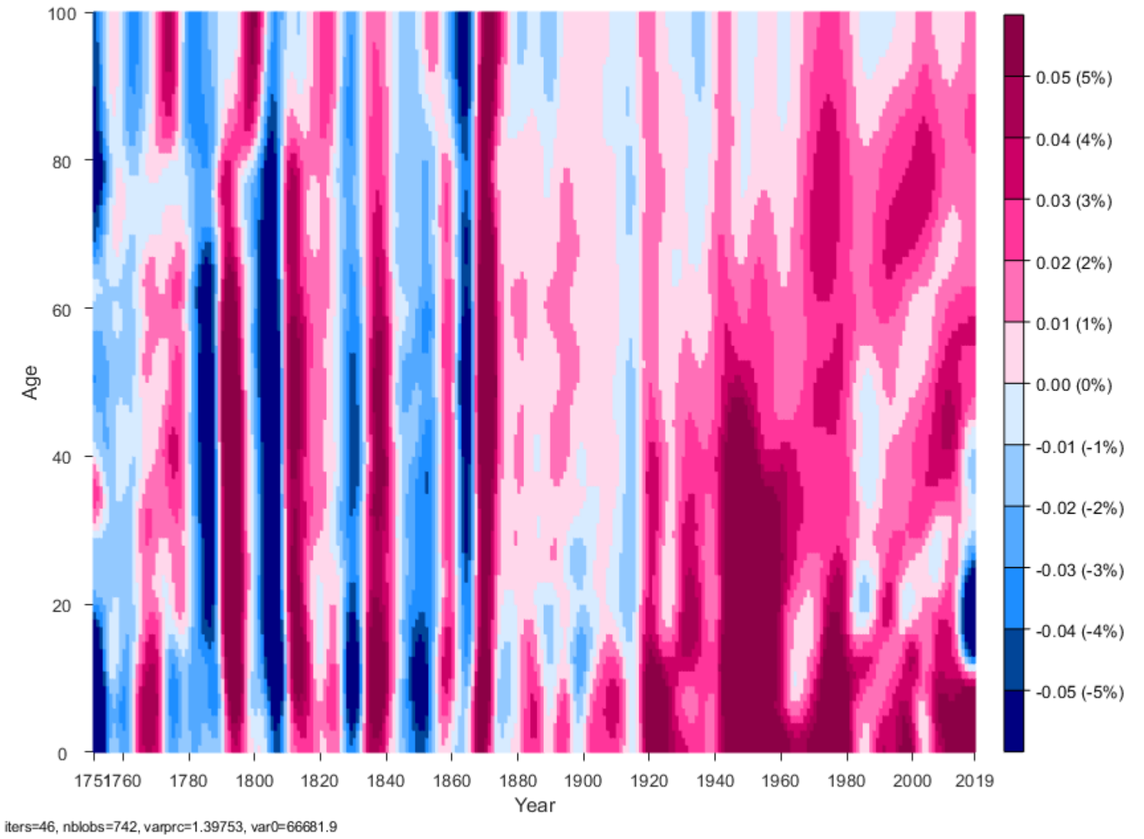
Finland

Males



iters=51, nblobs=757, varprc=1.47469, var0=67492.5

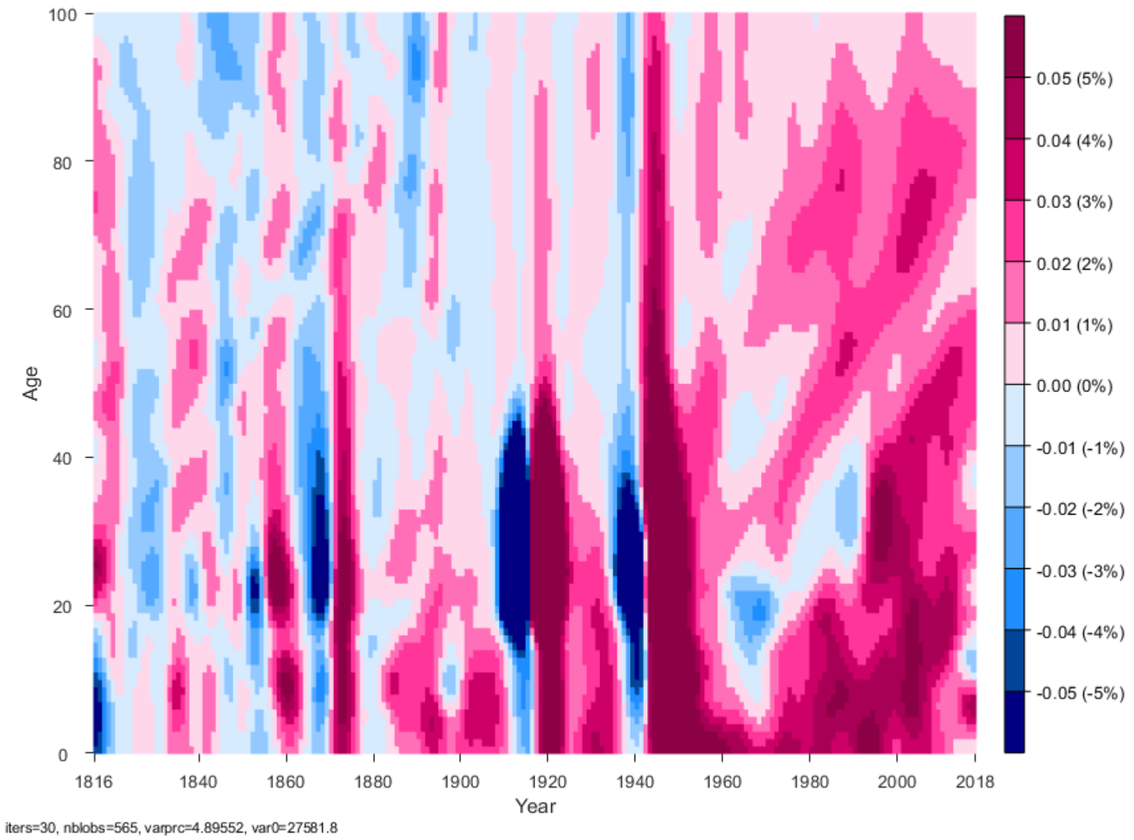
Females



iters=46, nblobs=742, varprc=1.39753, var0=66681.9

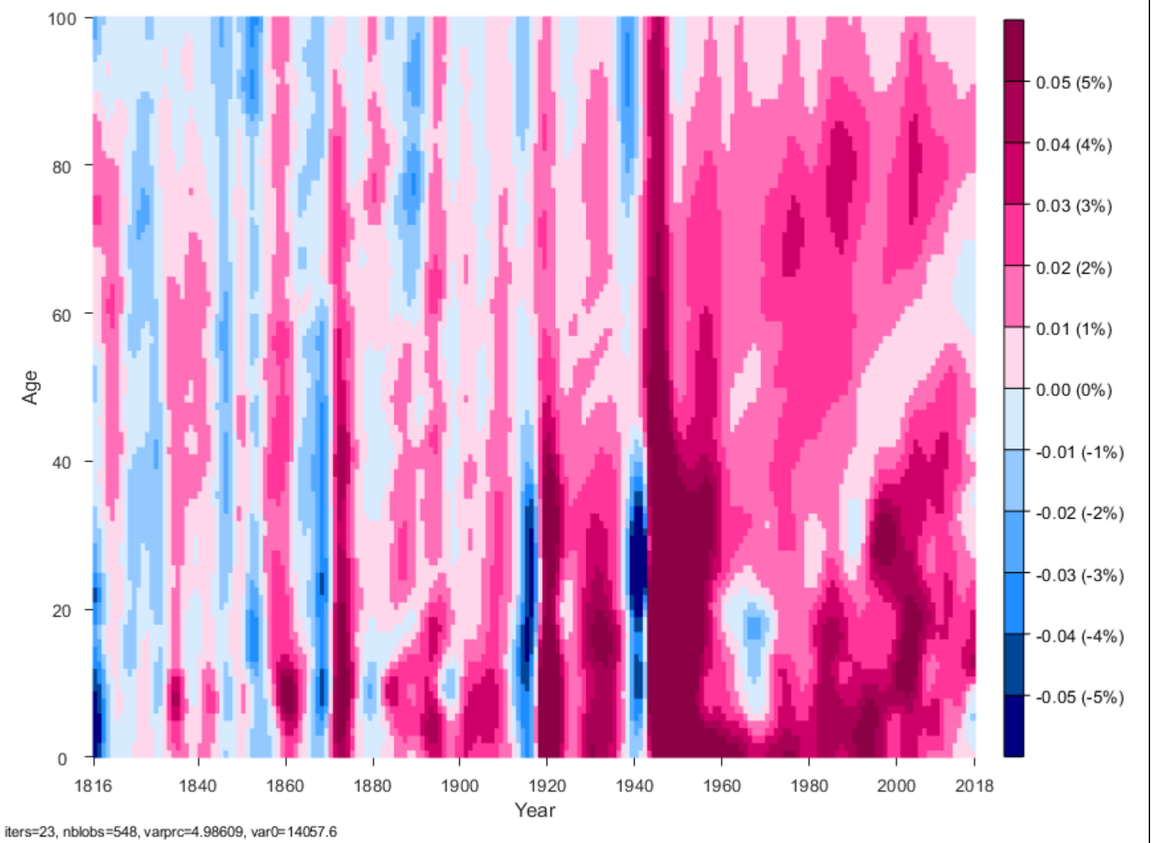
France

Males



iters=30, nblobs=565, varprc=4.89552, var0=27581.8

Females

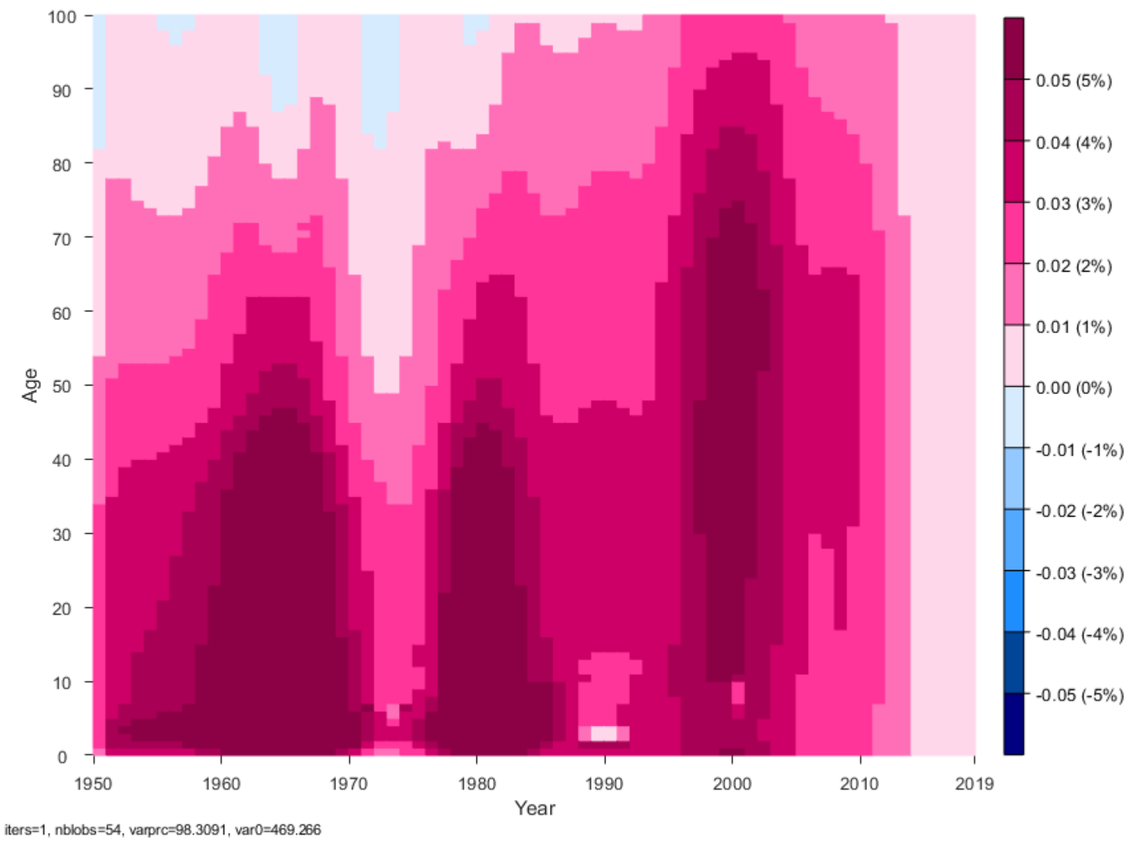


iters=23, nblobs=548, varprc=4.98609, var0=14057.6

French Guiana

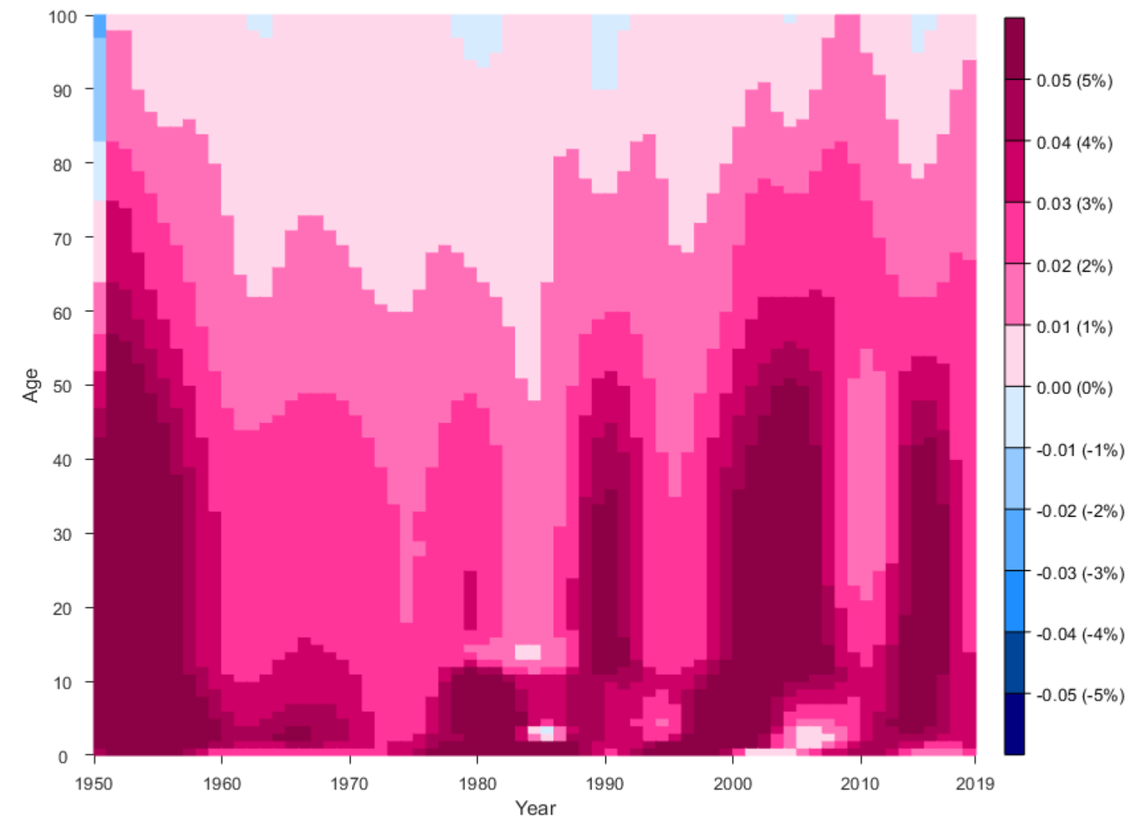
Males

Females



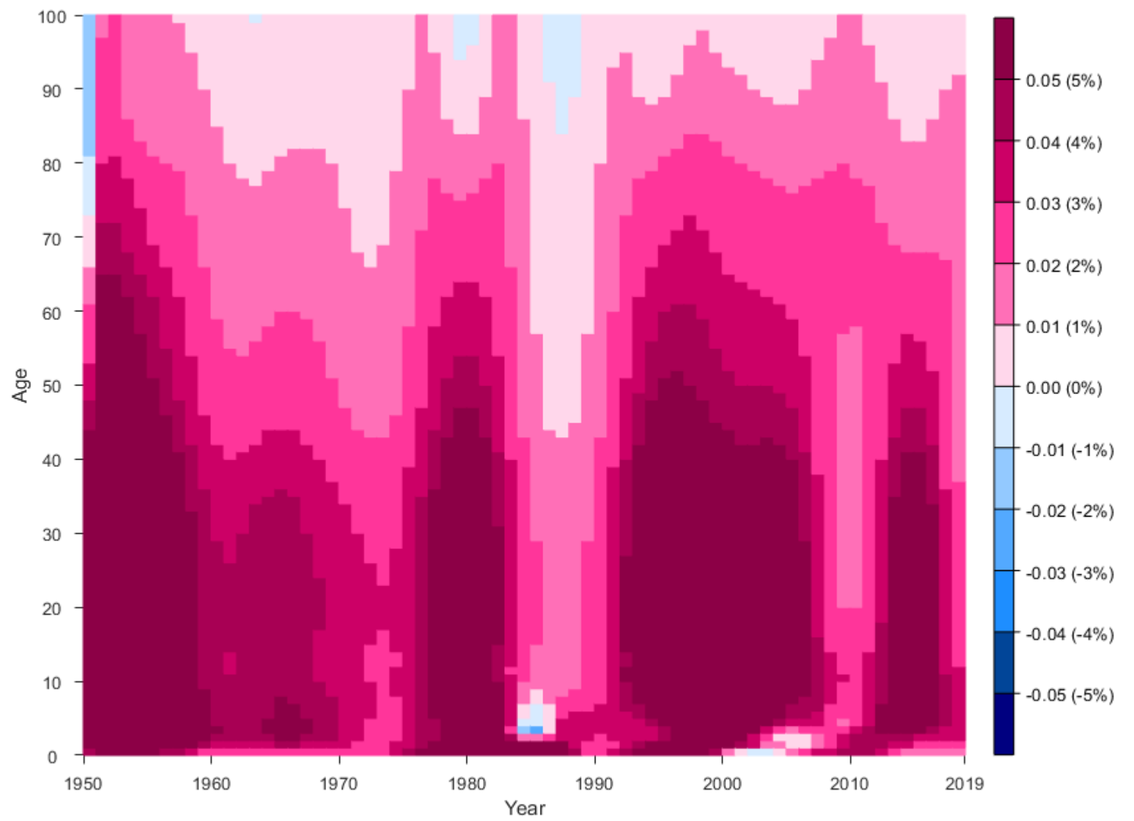
French Polynesia

Males



iters=1, nblobs=103, varprc=97.1694, var0=450.737

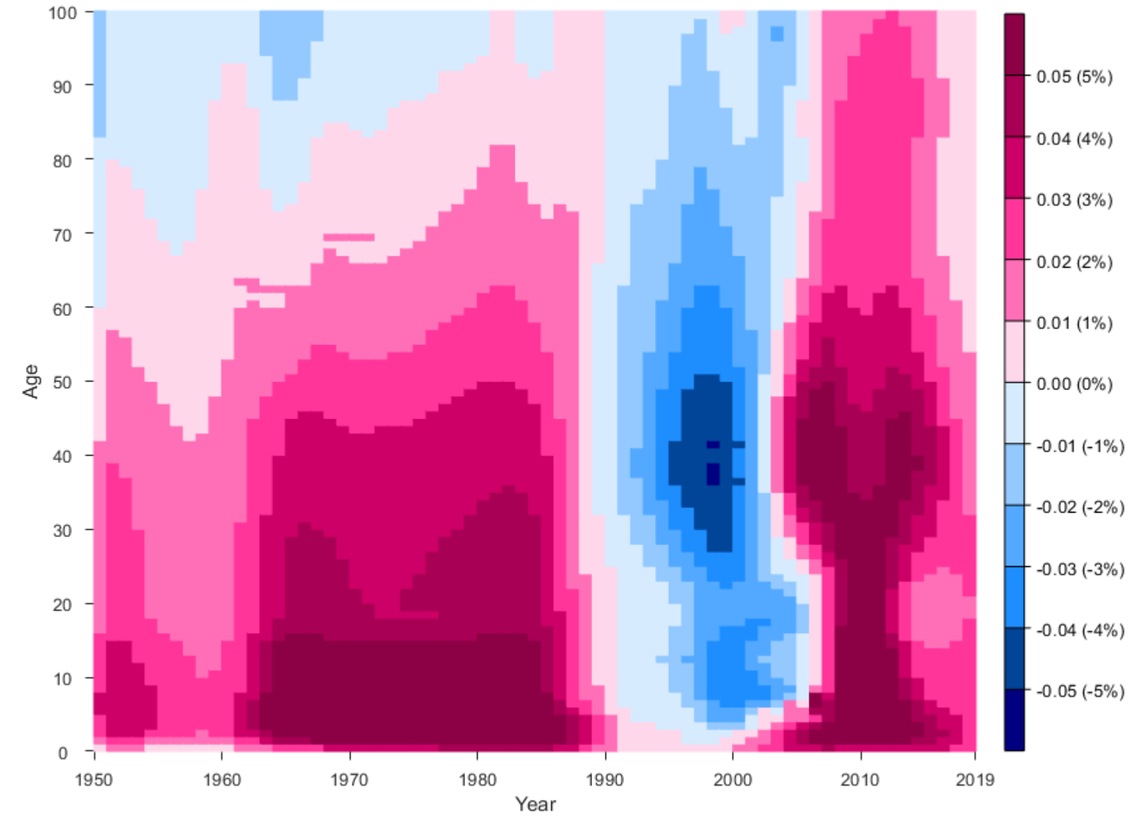
Females



iters=1, nblobs=103, varprc=97.4718, var0=681.388

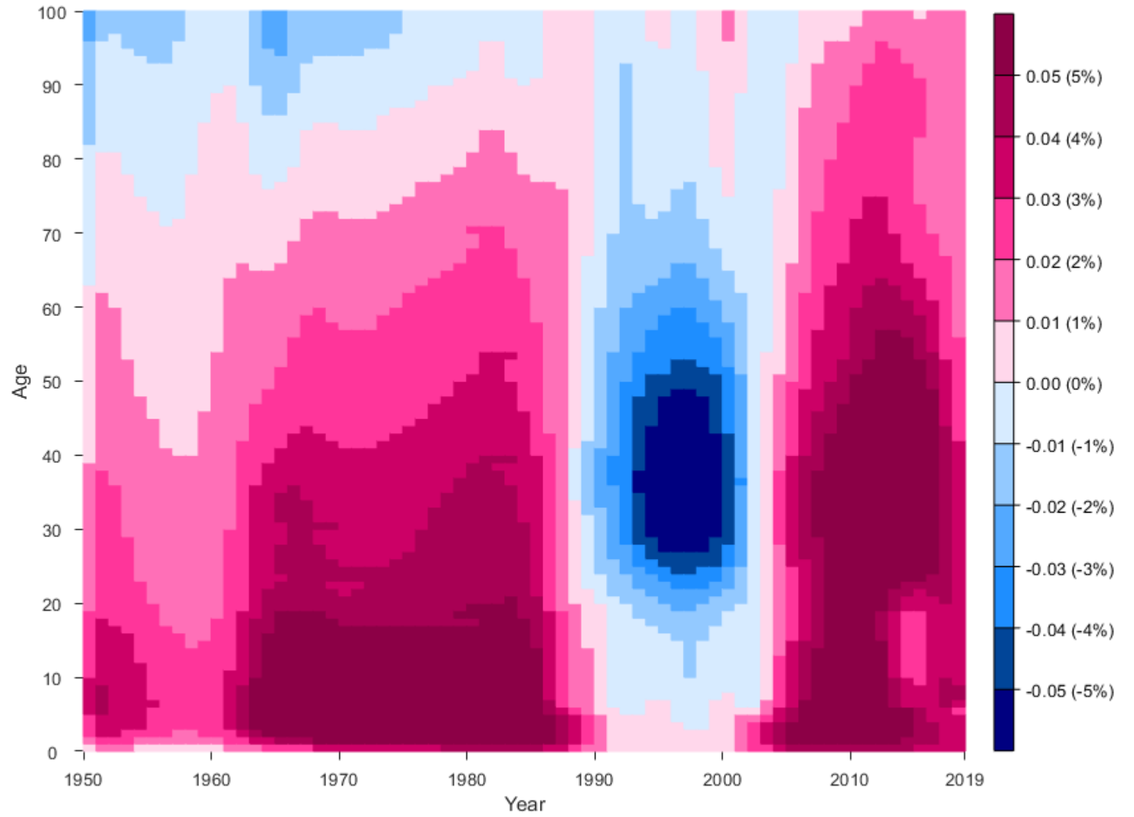
Gabon

Males



iters=1, nblobs=122, varprc=98.5745, var0=587.172

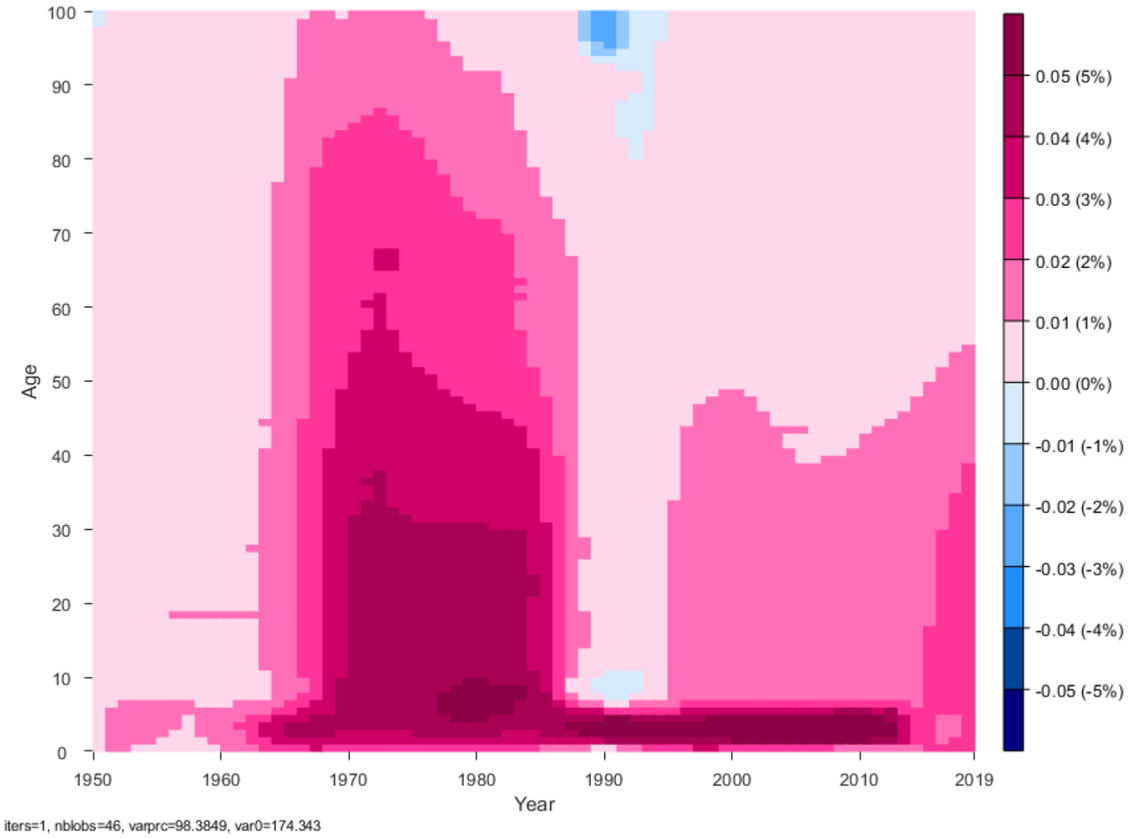
Females



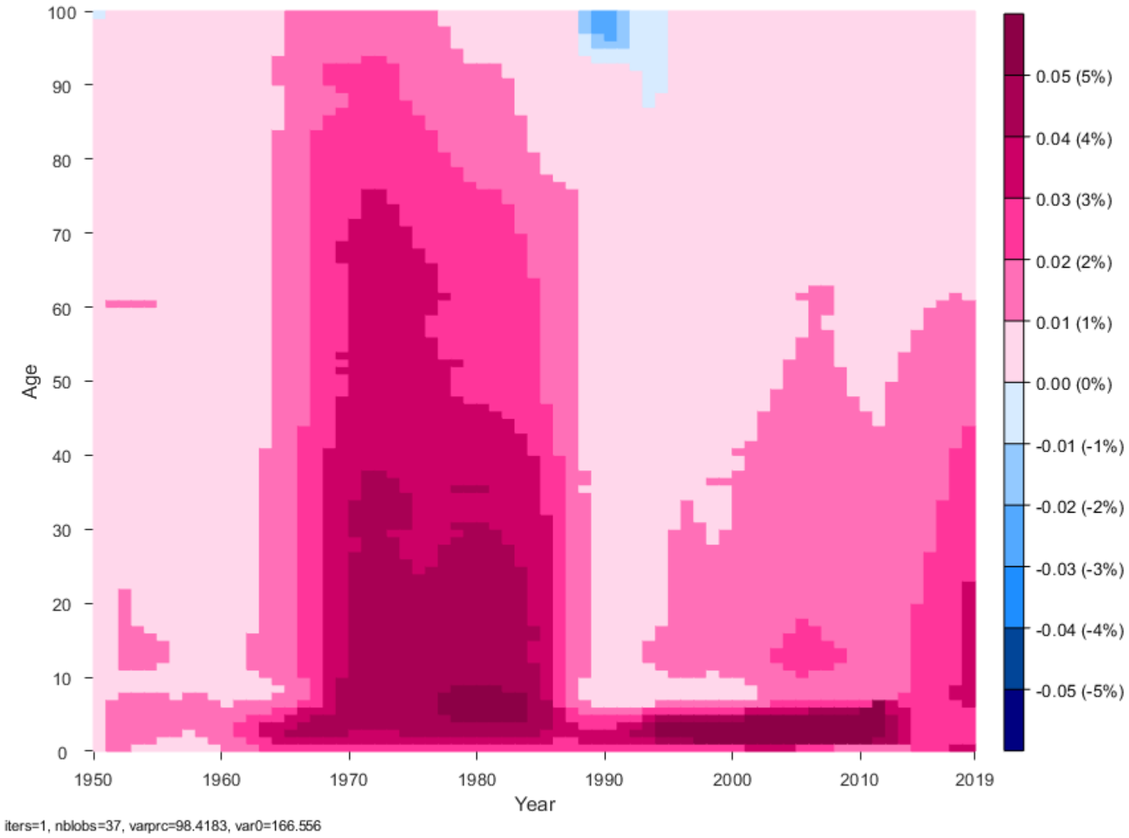
iters=1, nblobs=91, varprc=99.0941, var0=705.23

Gambia

Males

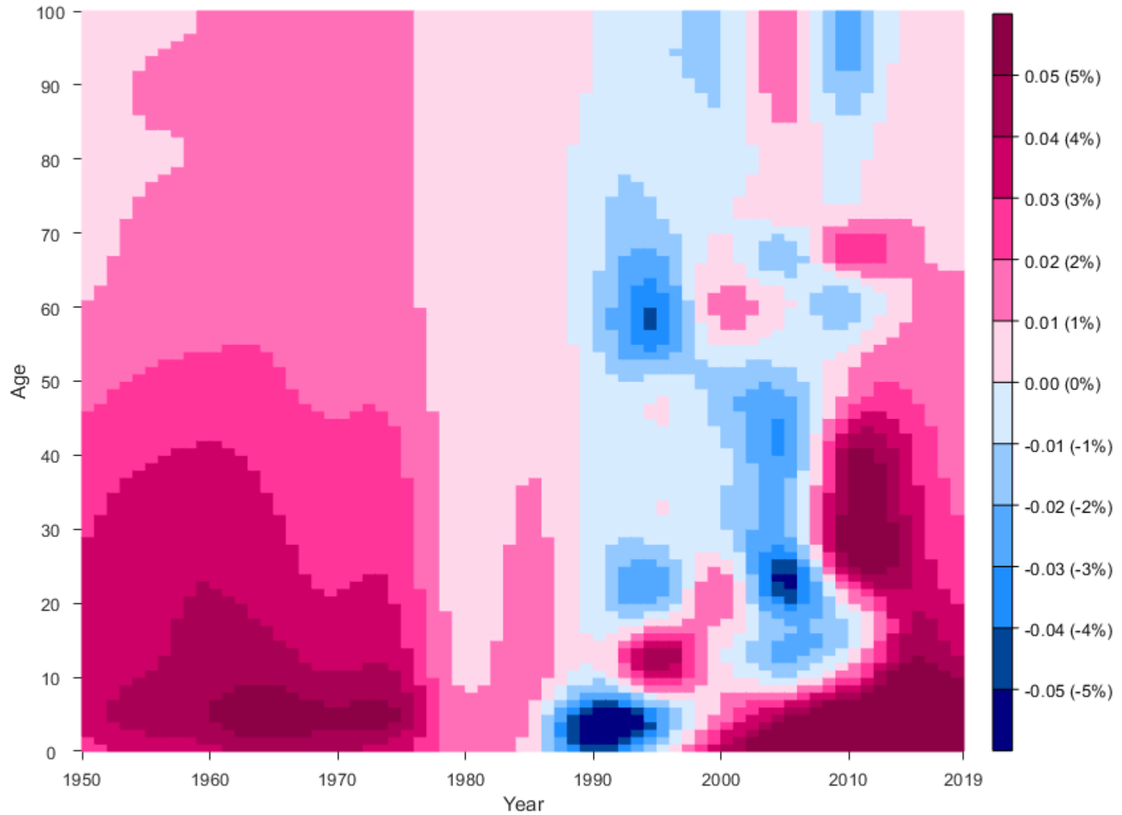


Females

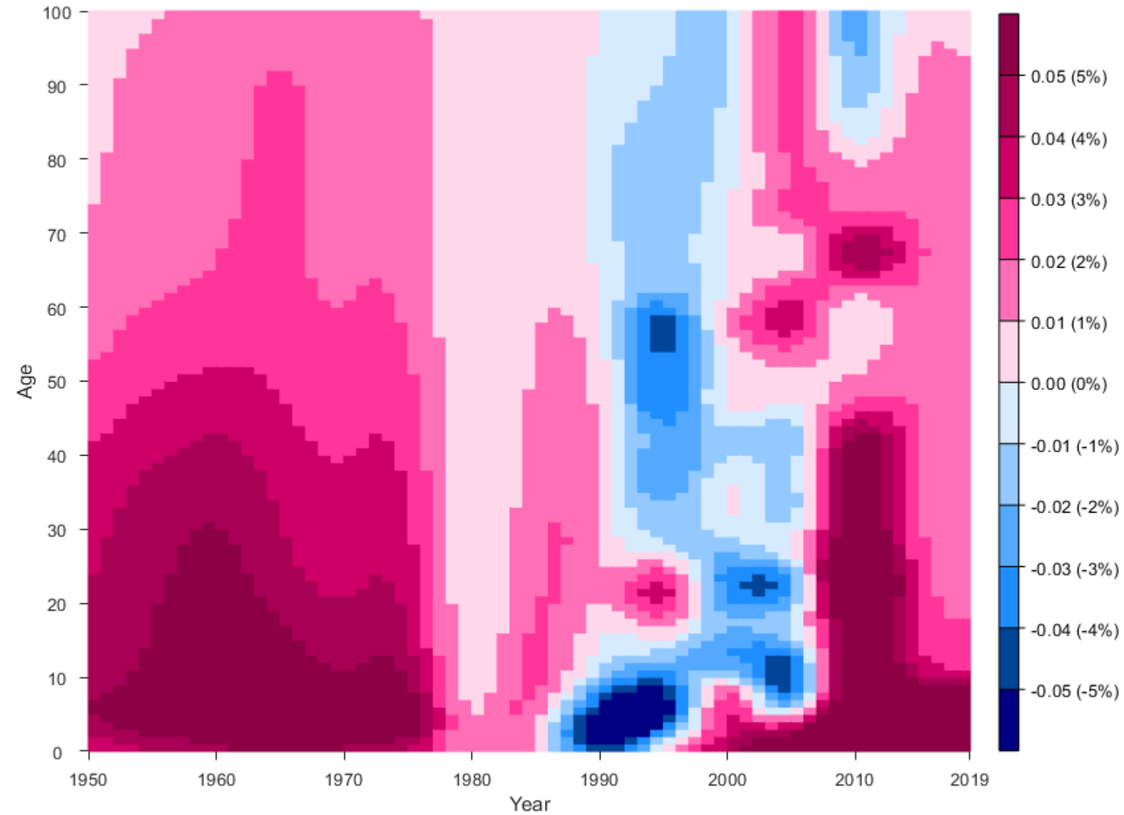


Georgia

Males

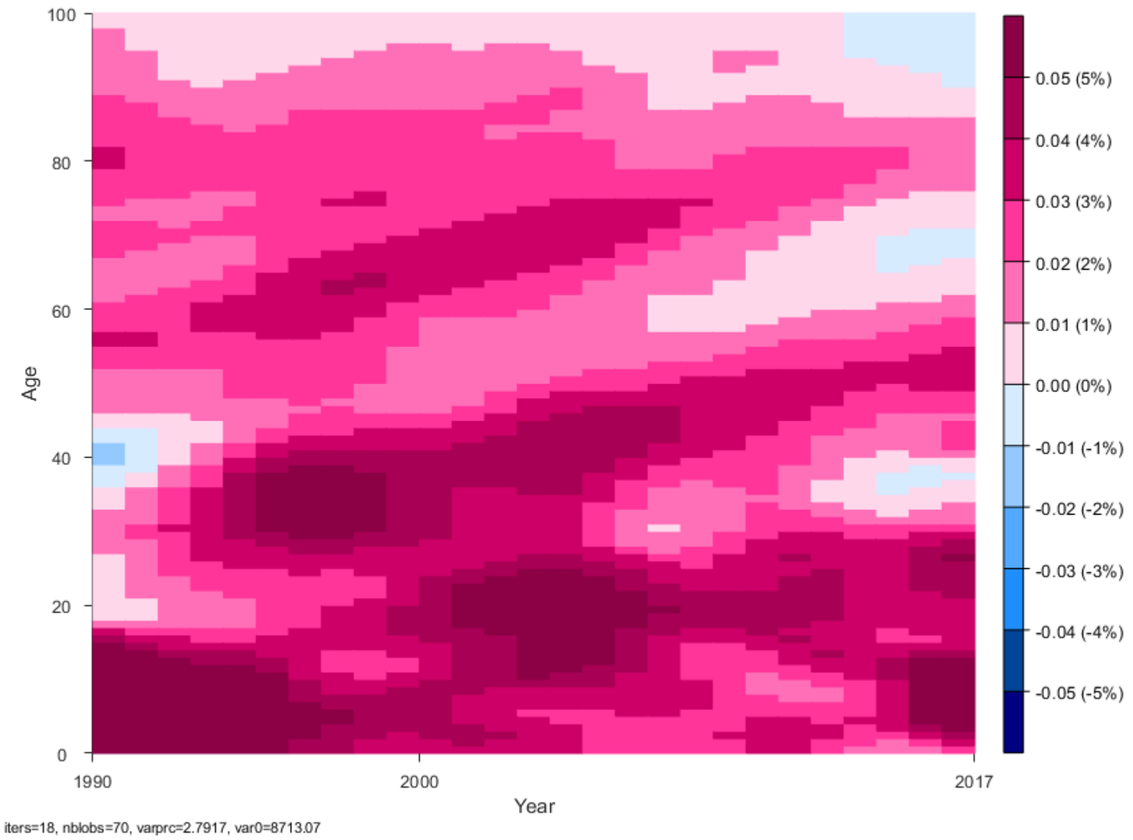


Females



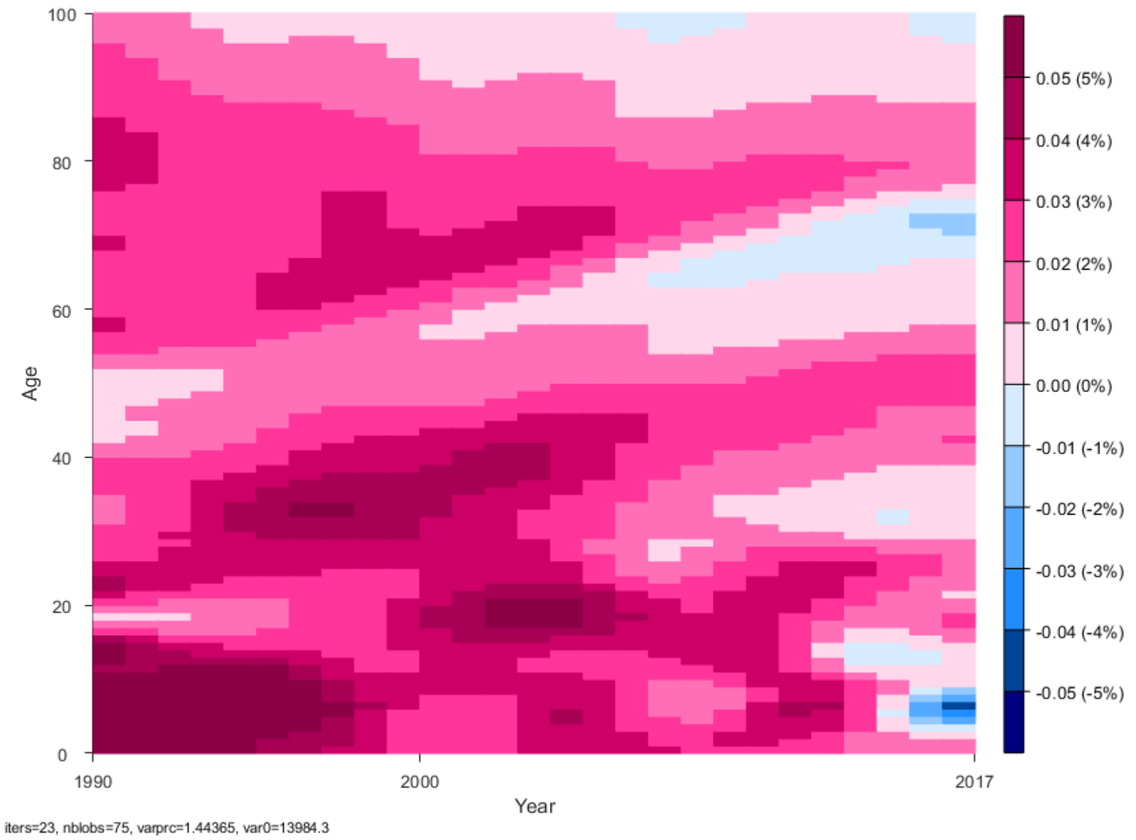
Germany

Males



iters=18, nblobs=70, varprc=2.7917, var0=8713.07

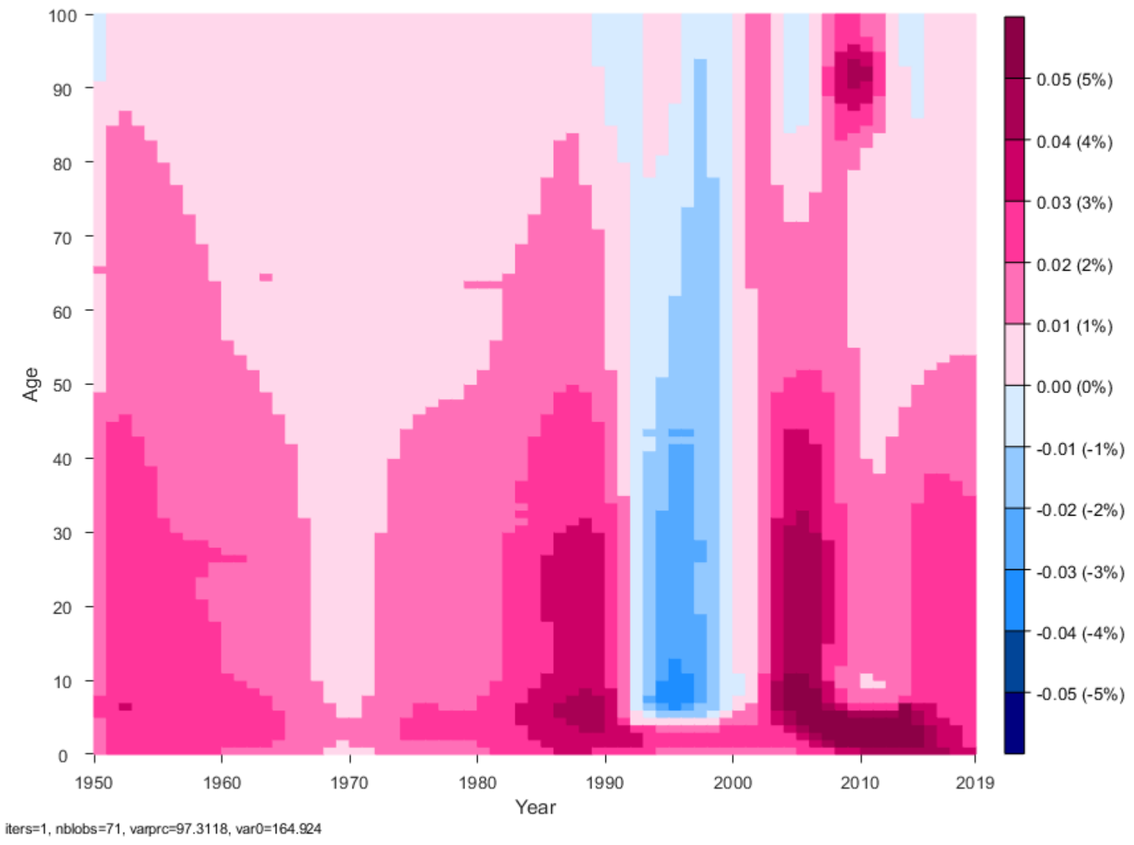
Females



iters=23, nblobs=75, varprc=1.44365, var0=13984.3

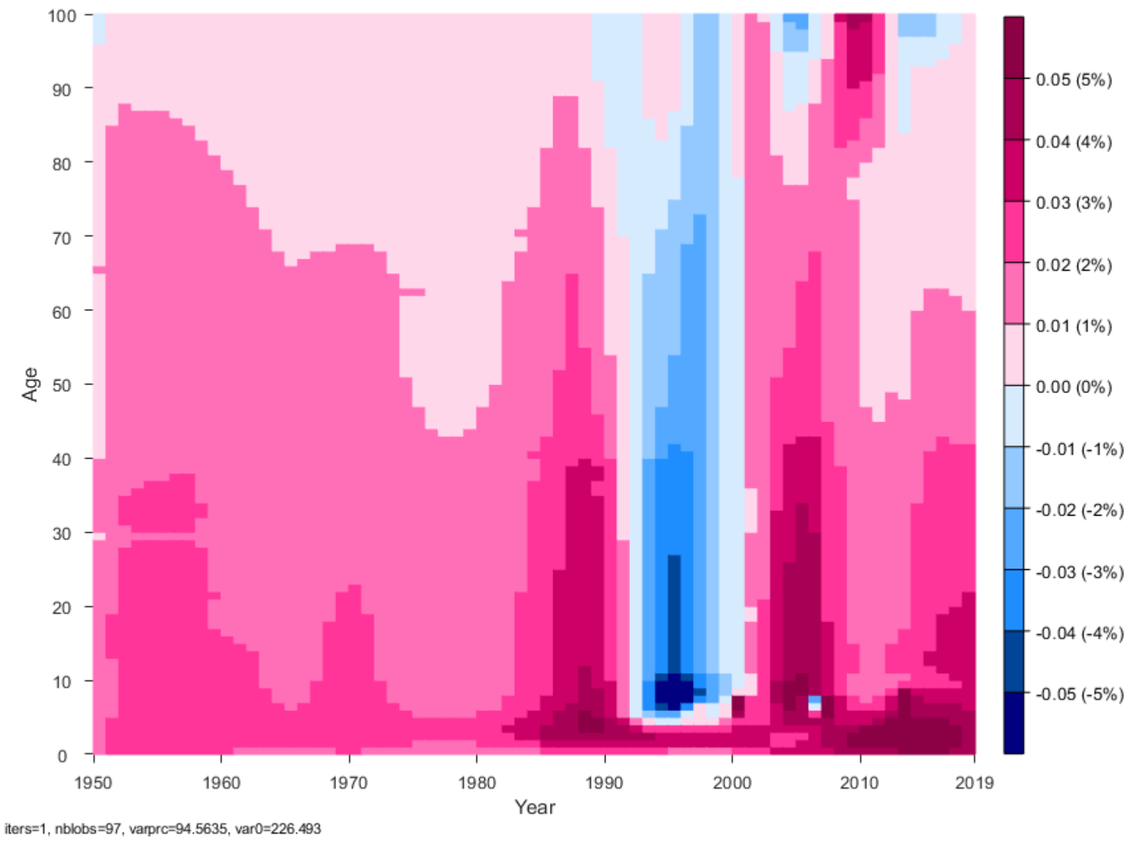
Ghana

Males



iters=1, nblobs=71, varprc=97.3118, var0=164.924

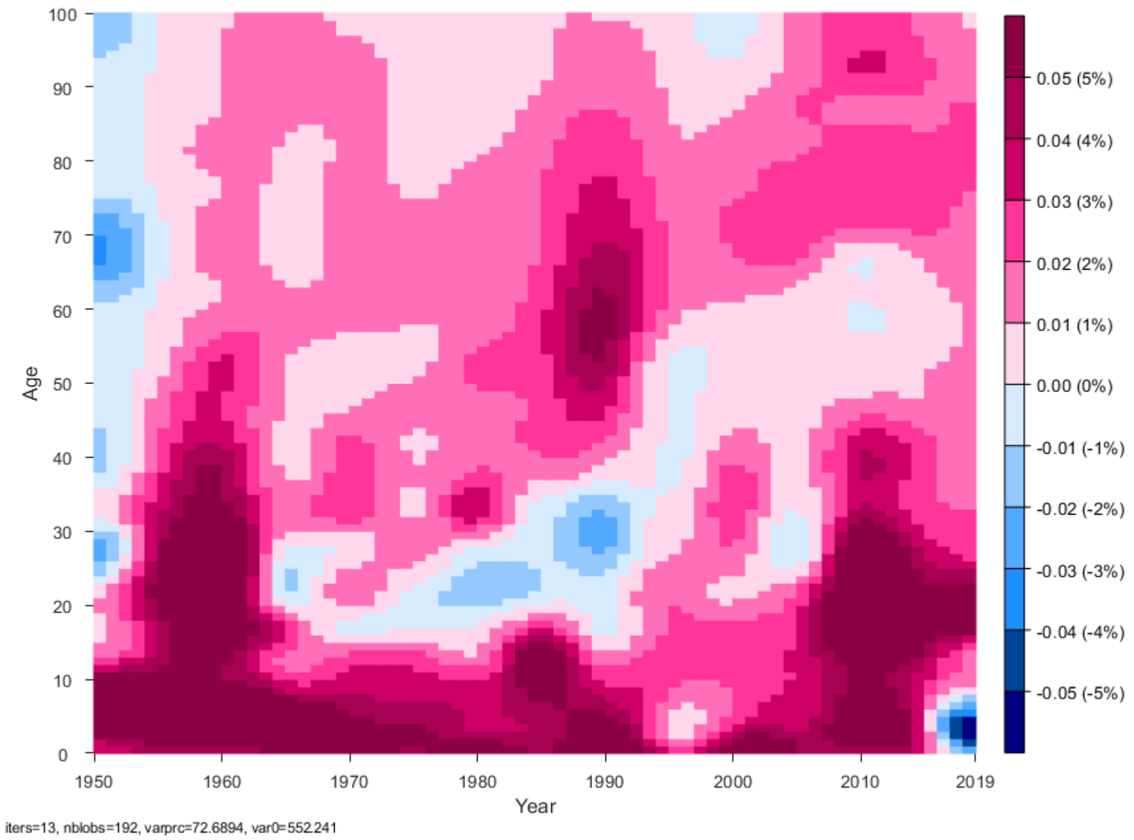
Females



iters=1, nblobs=97, varprc=94.5635, var0=226.493

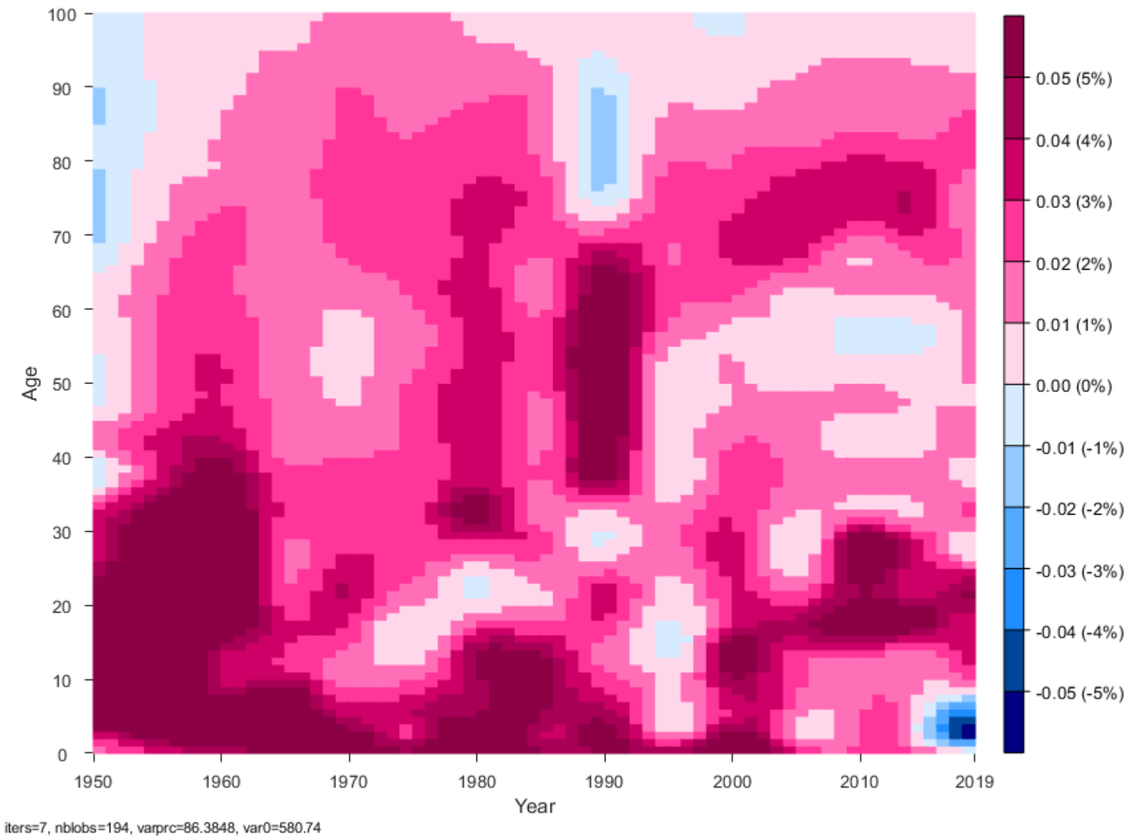
Greece

Males



iters=13, nblobs=192, varprc=72.6894, var0=552.241

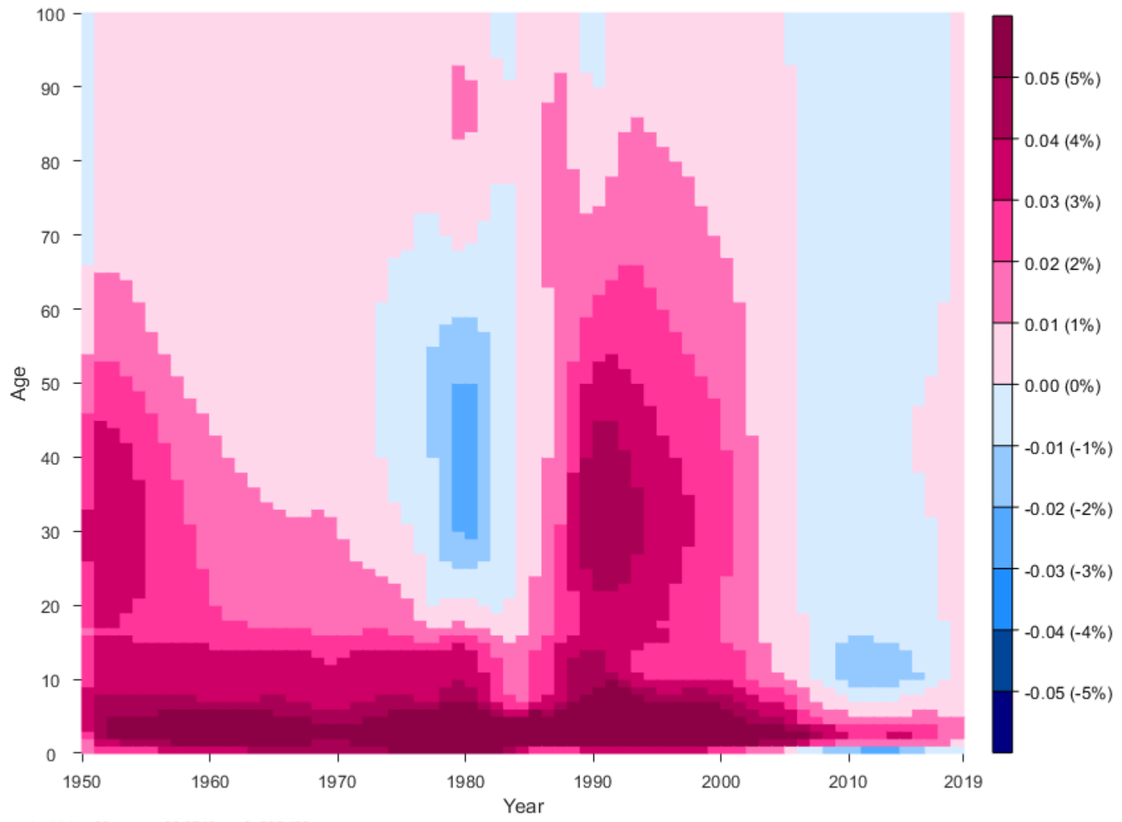
Females



iters=7, nblobs=194, varprc=86.3848, var0=580.74

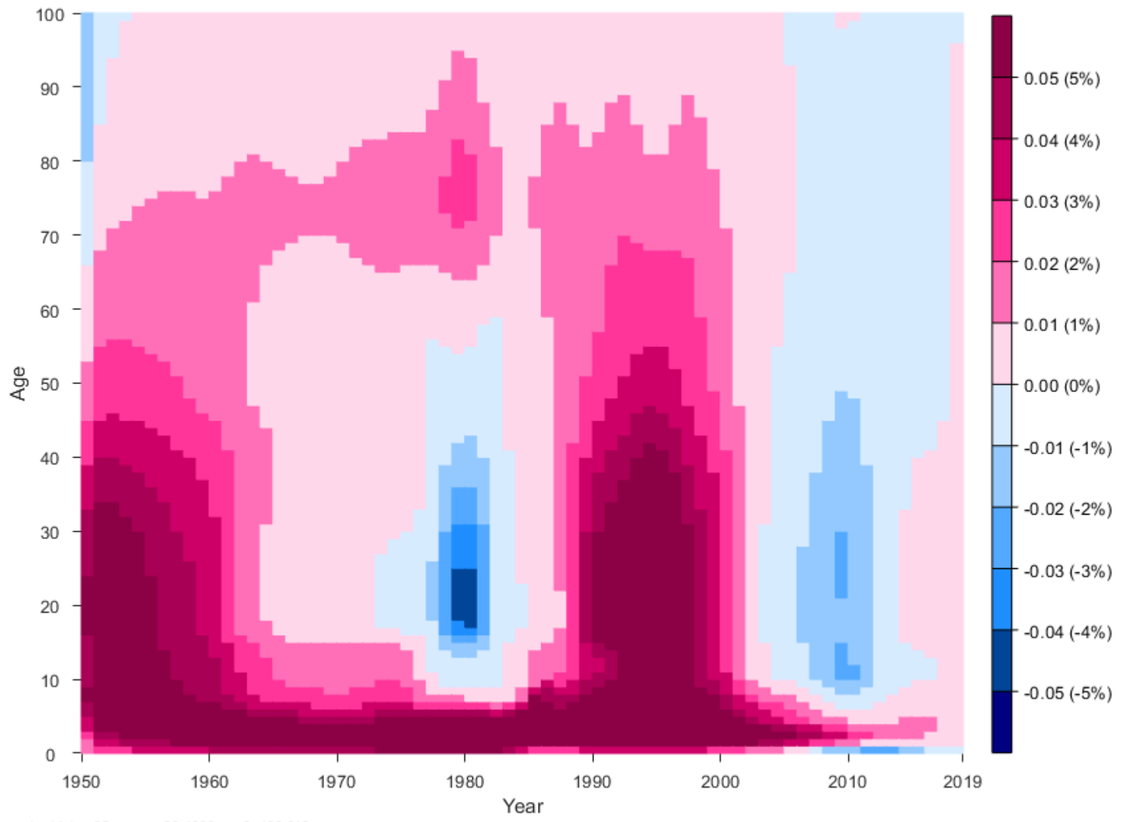
Grenada

Males



iters=1, nblobs=62, varprc=98.3743, var0=295.433

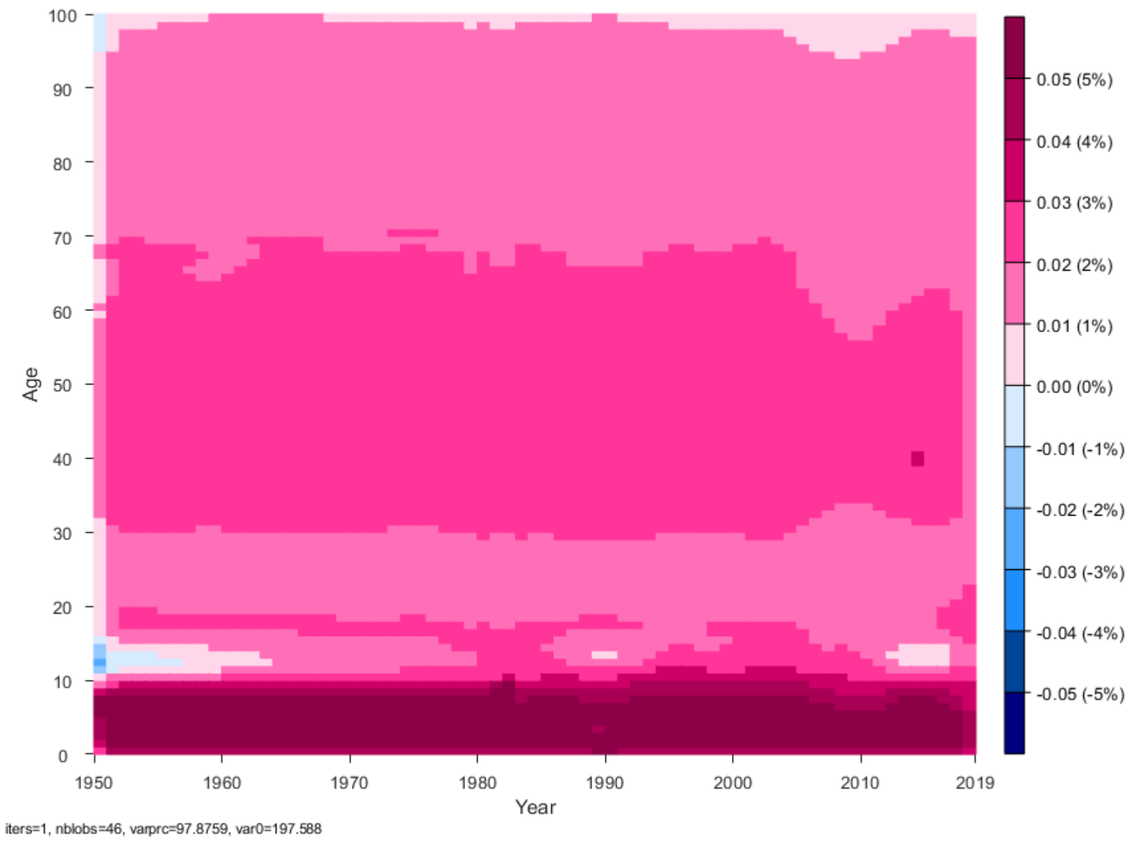
Females



iters=1, nblobs=95, varprc=98.4688, var0=436.616

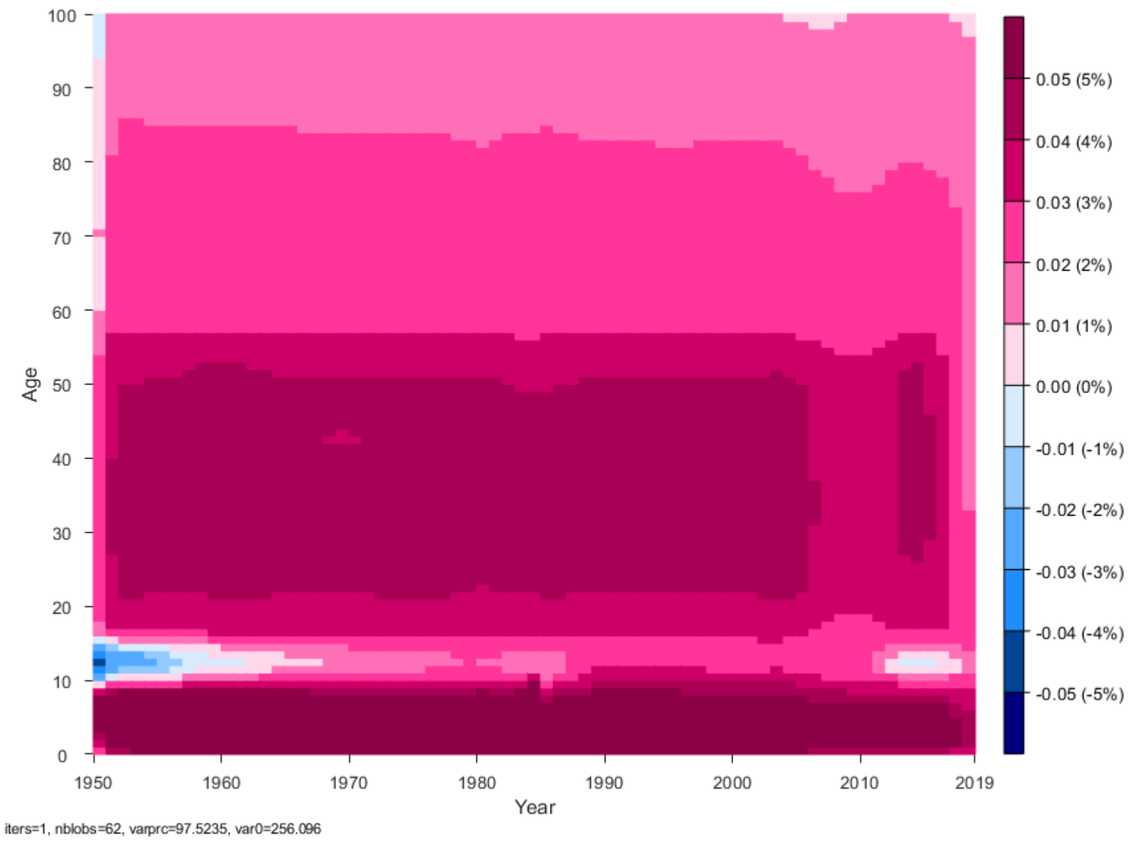
Guadeloupe

Males



iters=1, nblobs=46, varprc=97.8759, var0=197.588

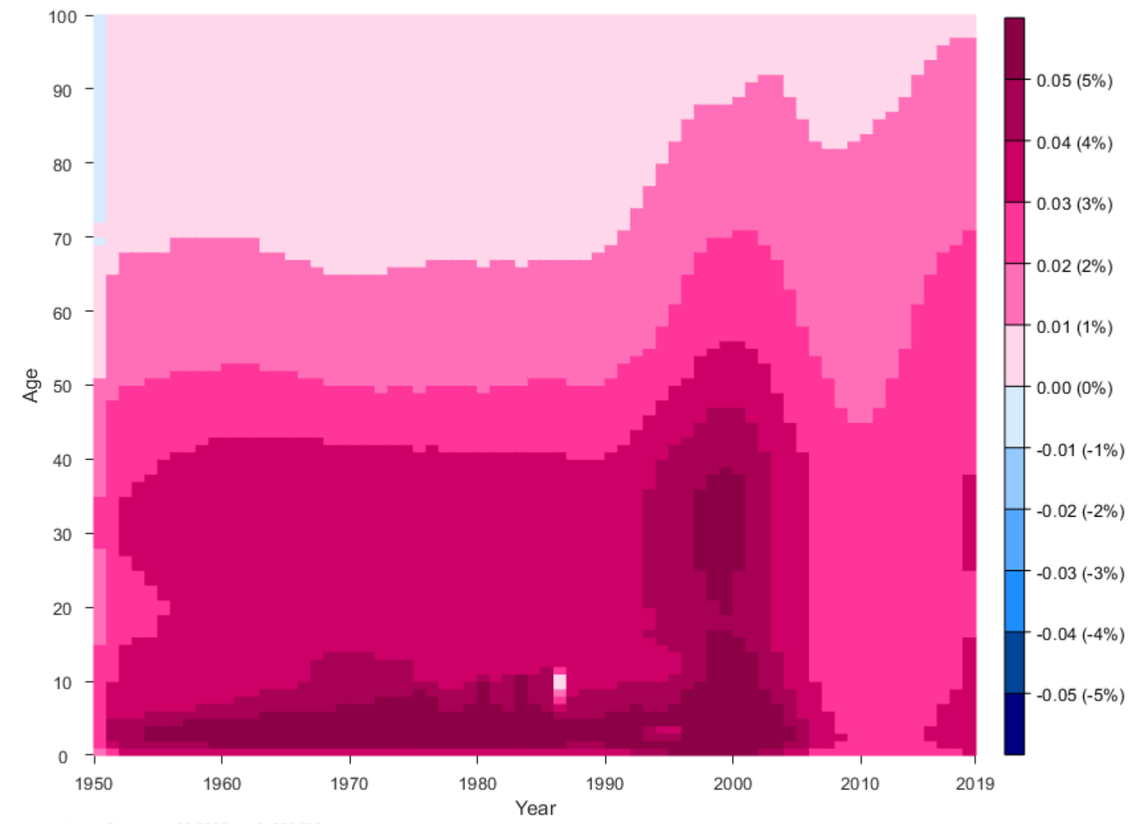
Females



iters=1, nblobs=62, varprc=97.5235, var0=256.096

Guam

Males



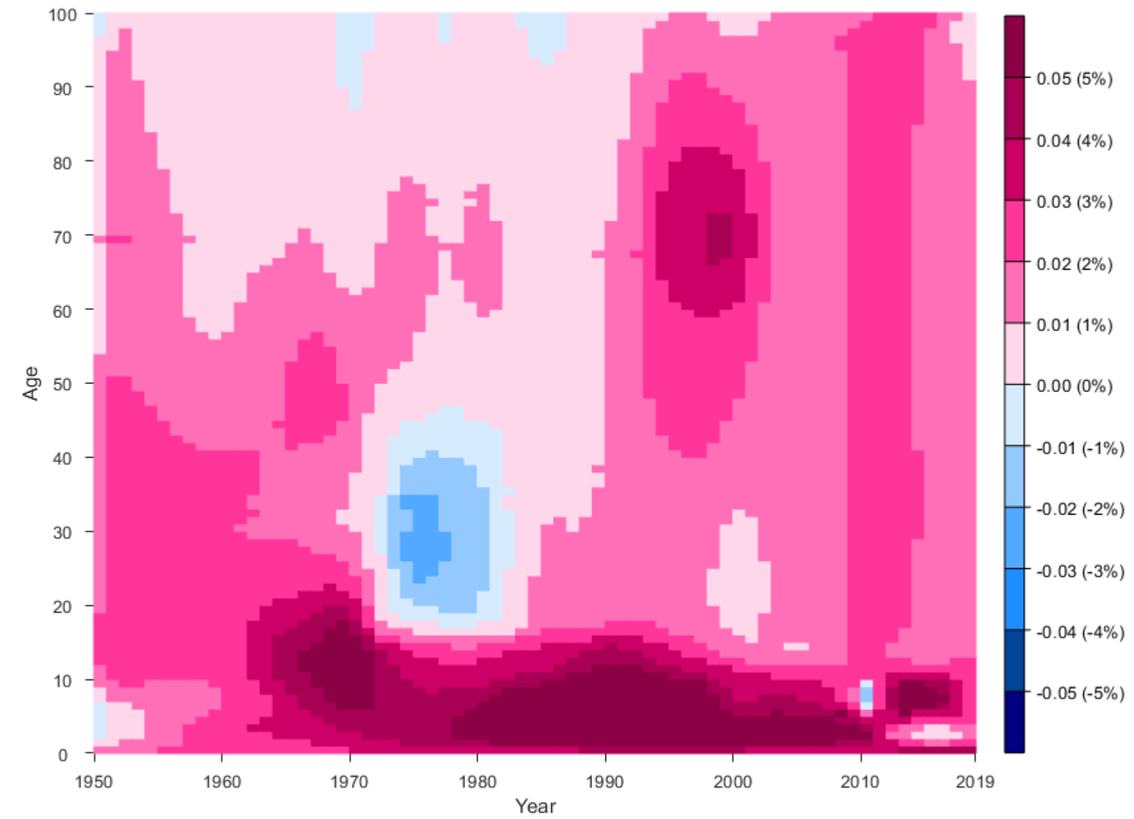
iters=1, nblobs=31, varprc=98.5305, var0=223.609

Females

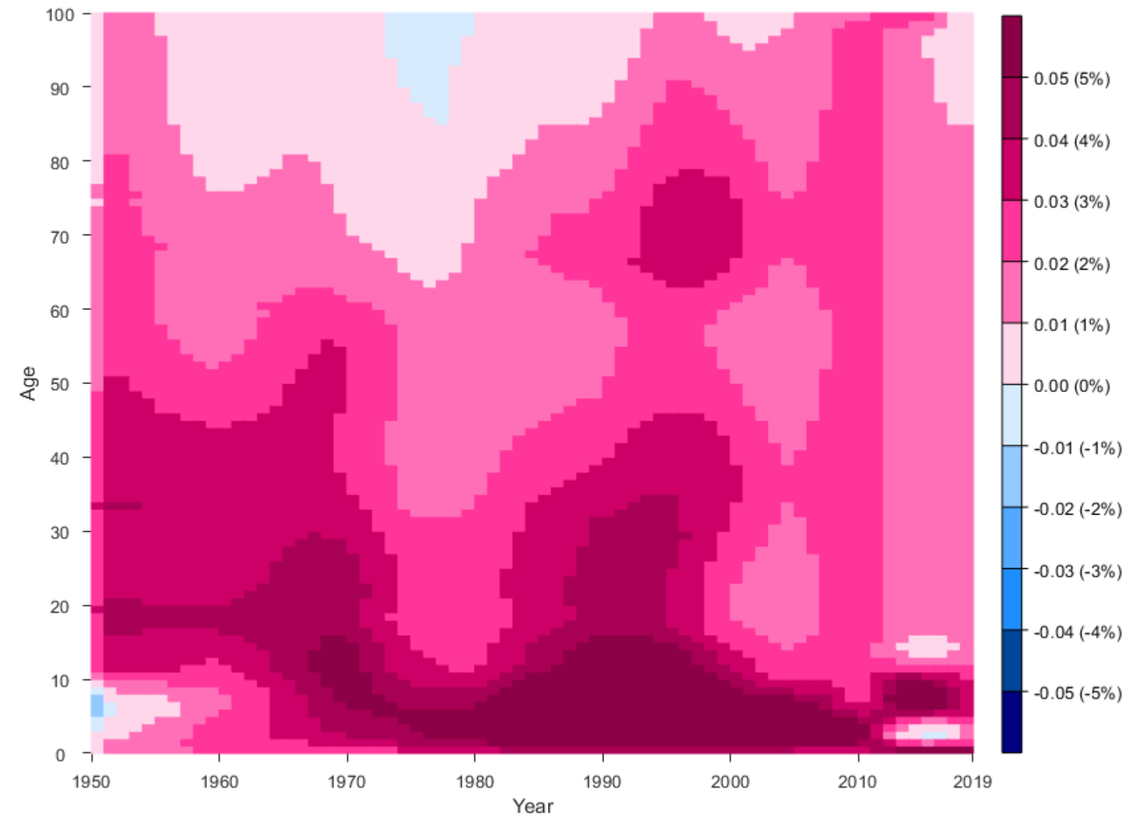
iters=1, nblobs=23, varprc=98.7812, var0=229.372

Guatemala

Males

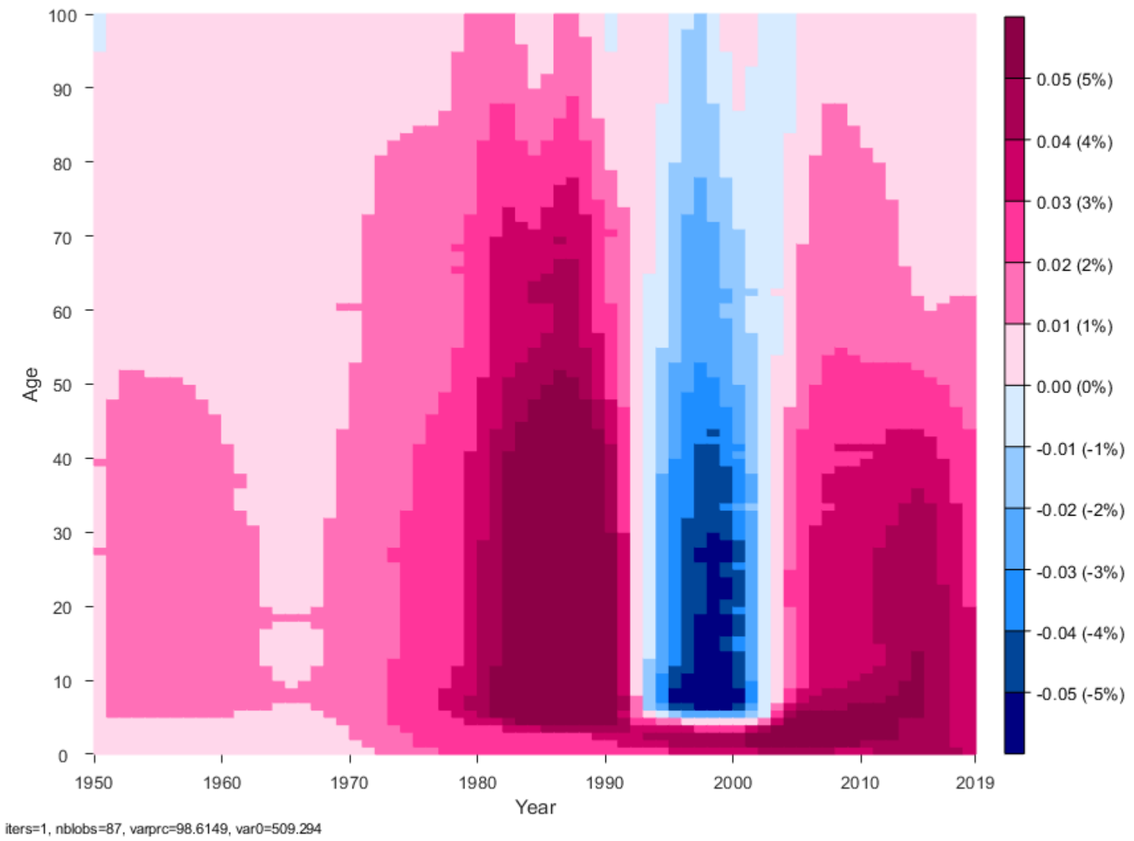


Females

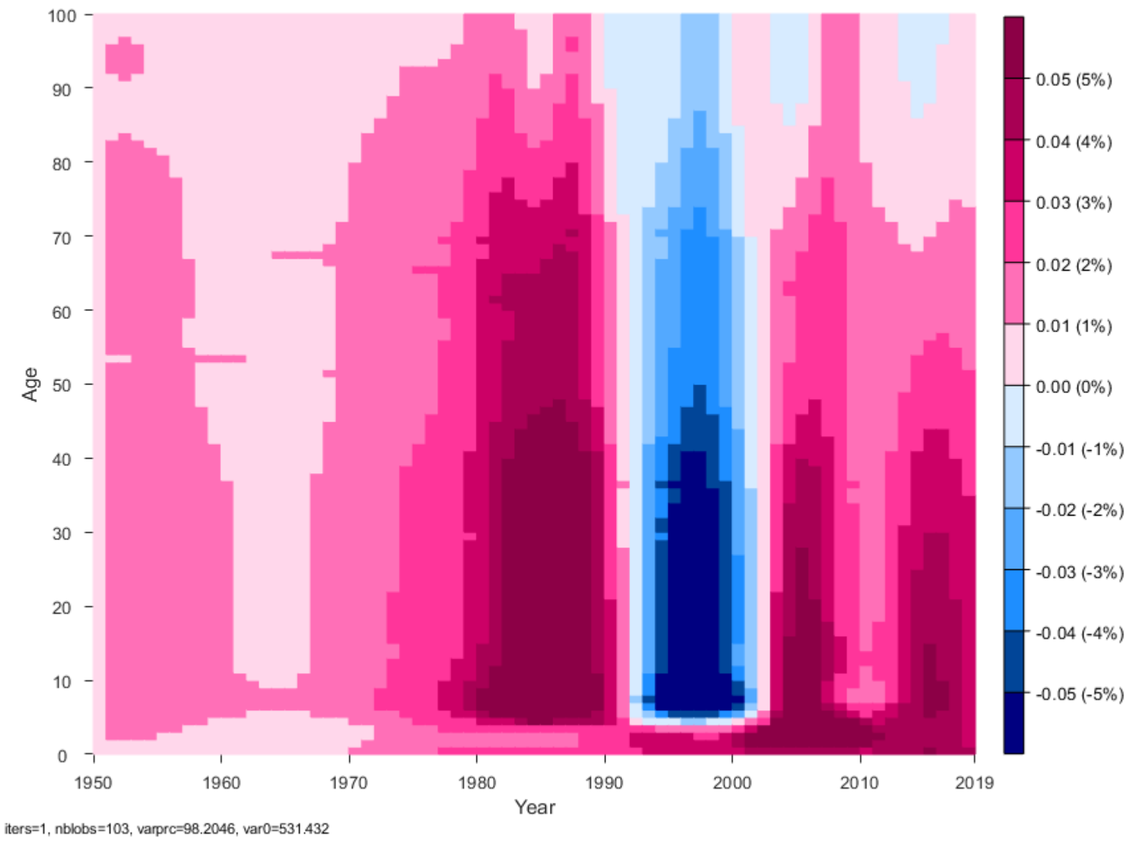


Guinea

Males

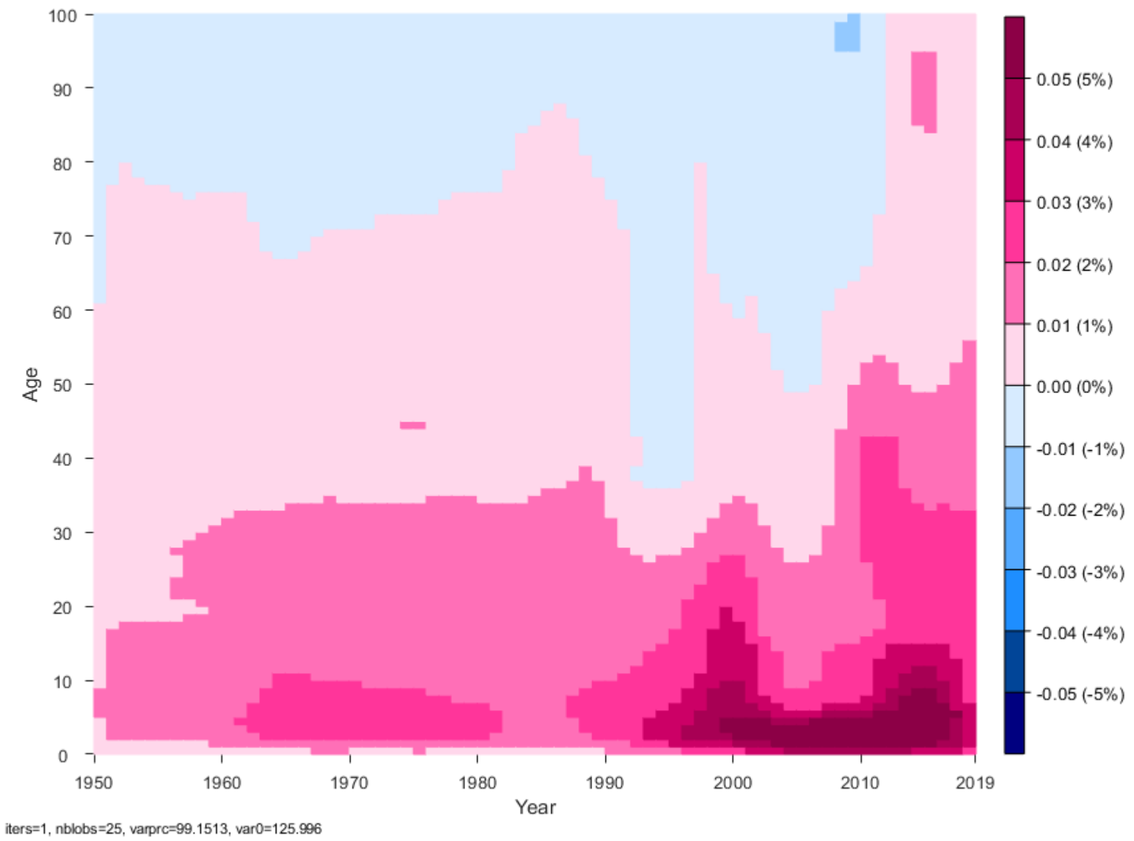


Females

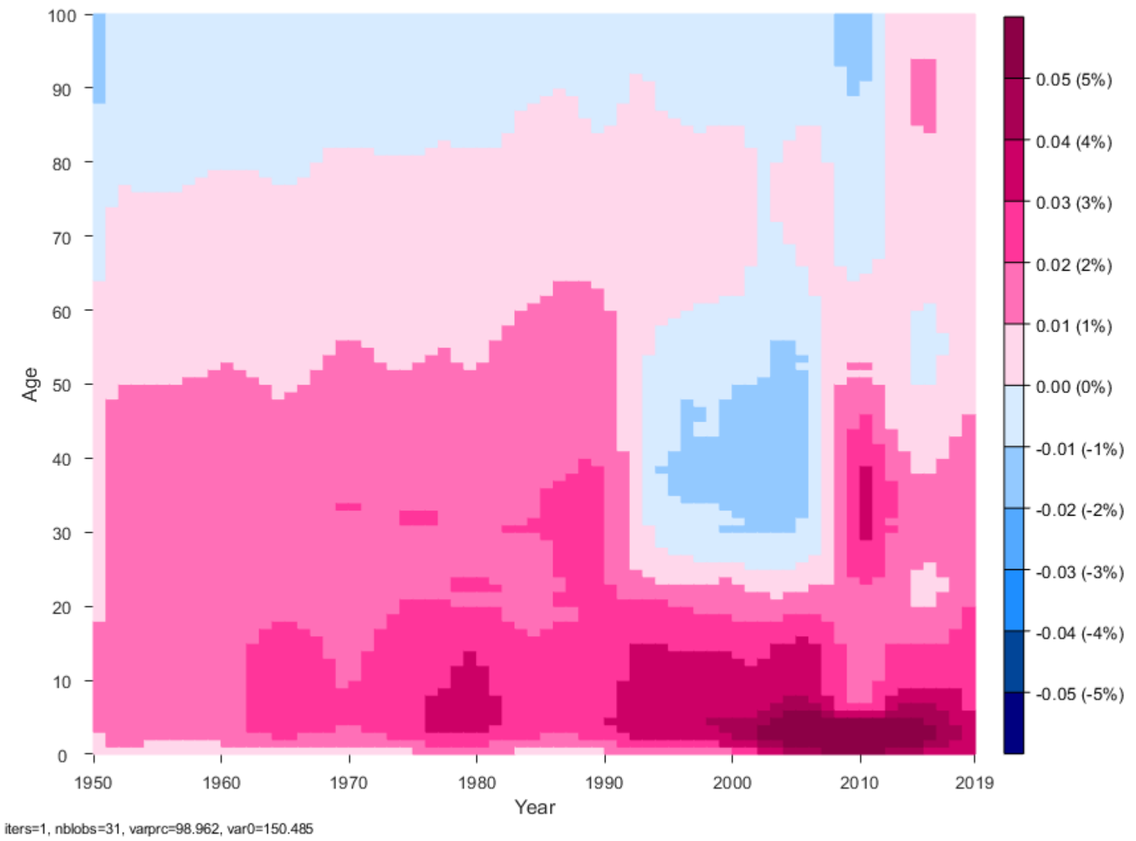


Guinea-Bissau

Males

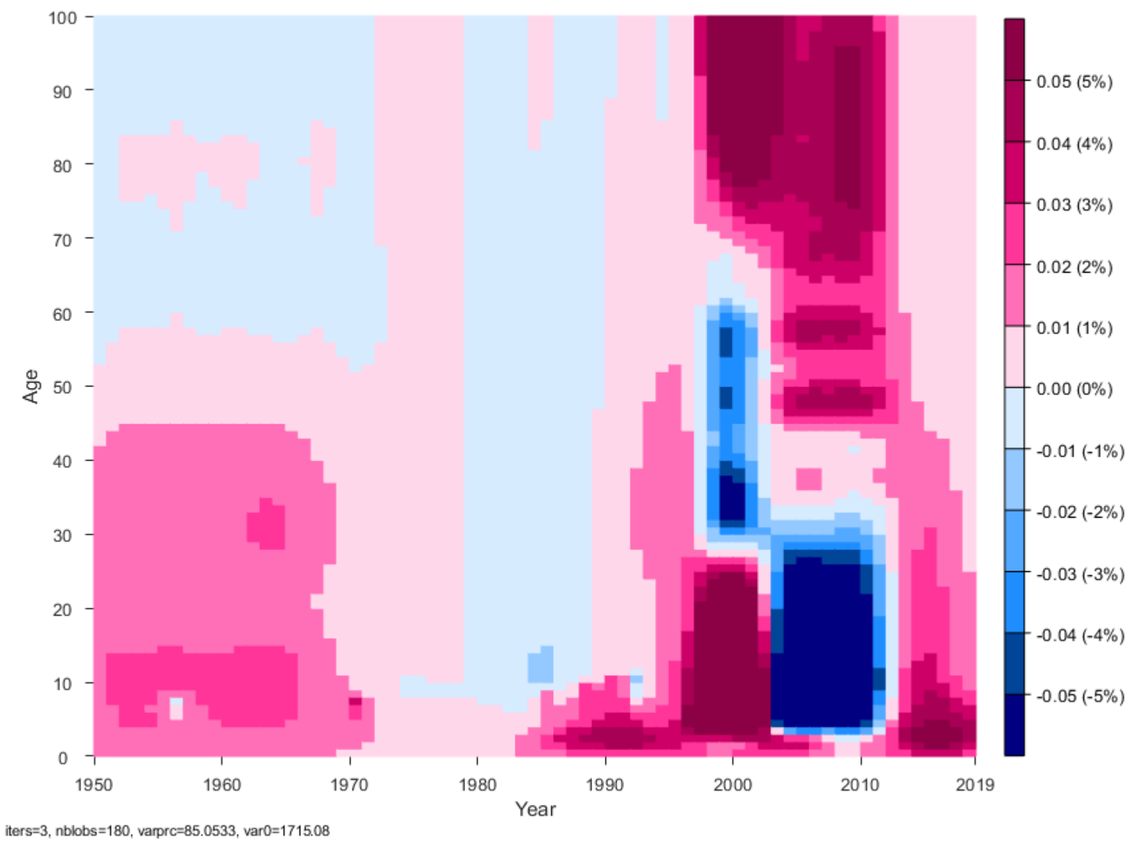


Females



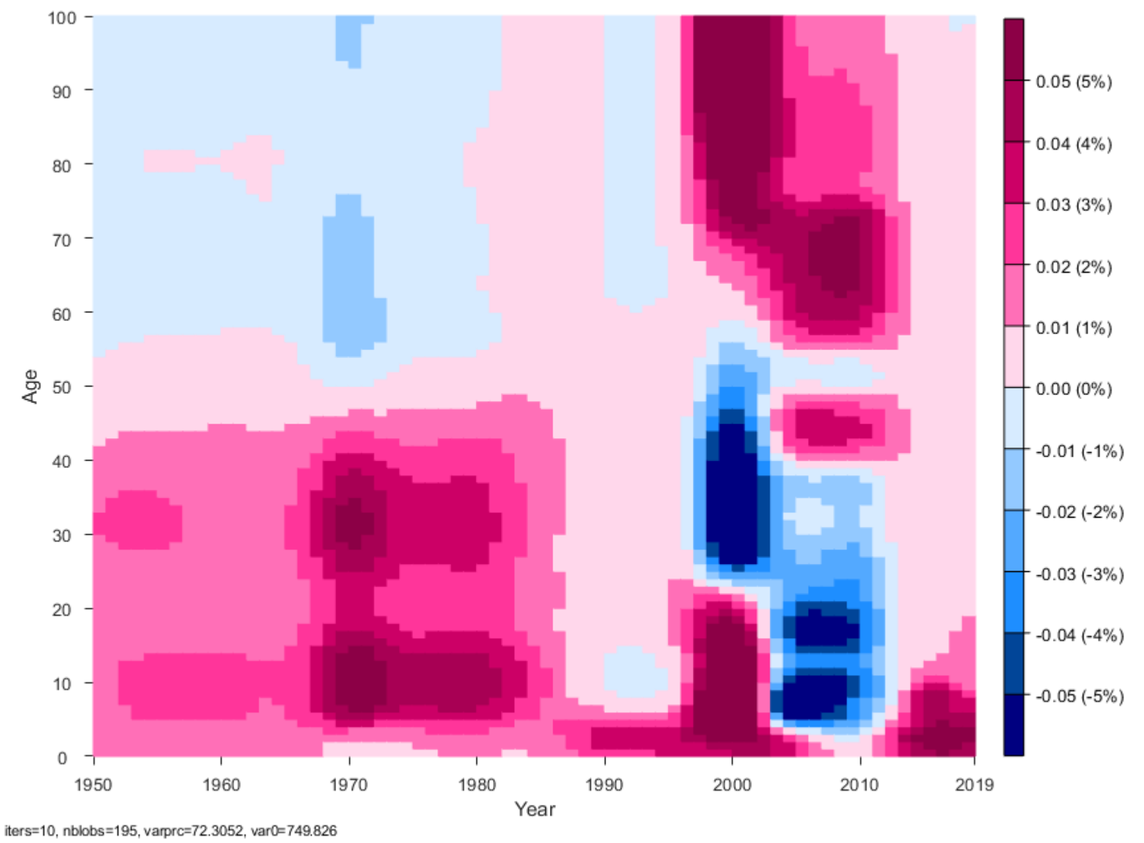
Guyana

Males



iters=3, nblobs=180, varprc=85.0533, var0=1715.08

Females



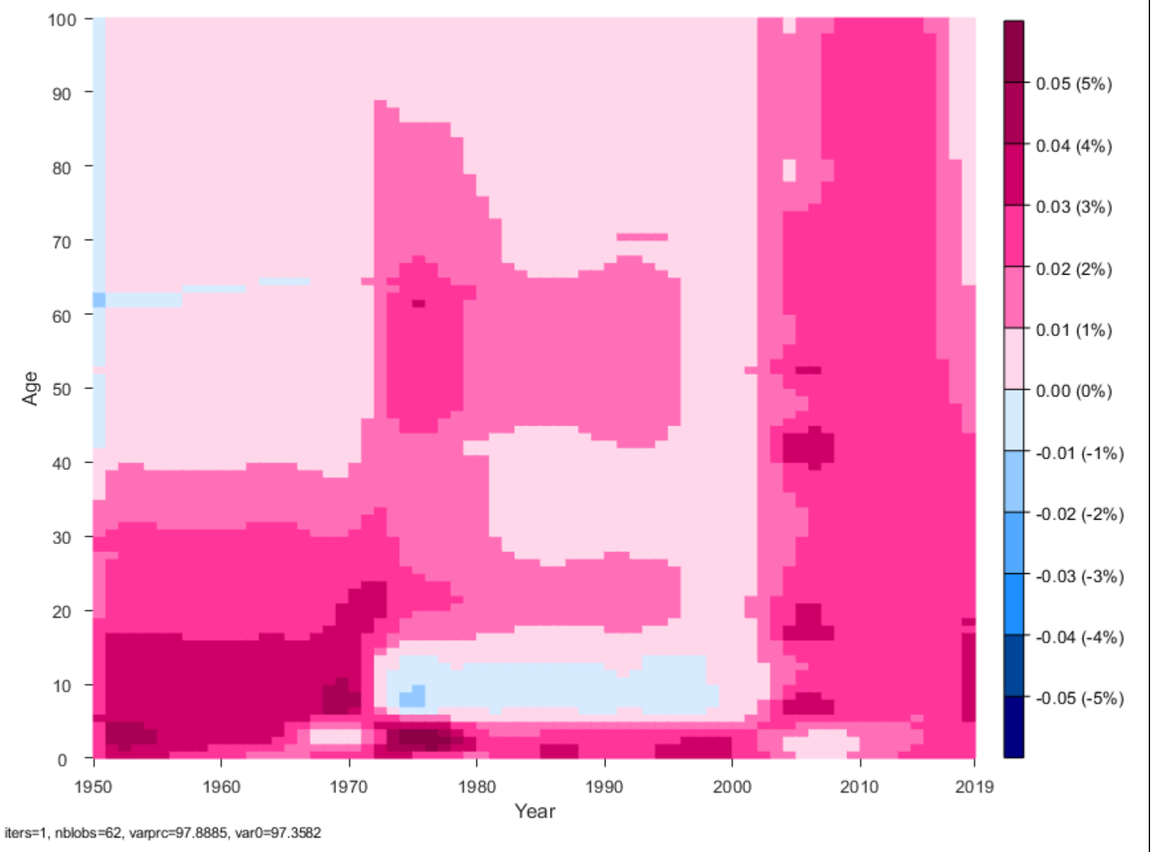
iters=10, nblobs=195, varprc=72.3052, var0=749.826

Haiti

Males

iters=1, nblobs=64, varprc=97.9316, var0=89.9769

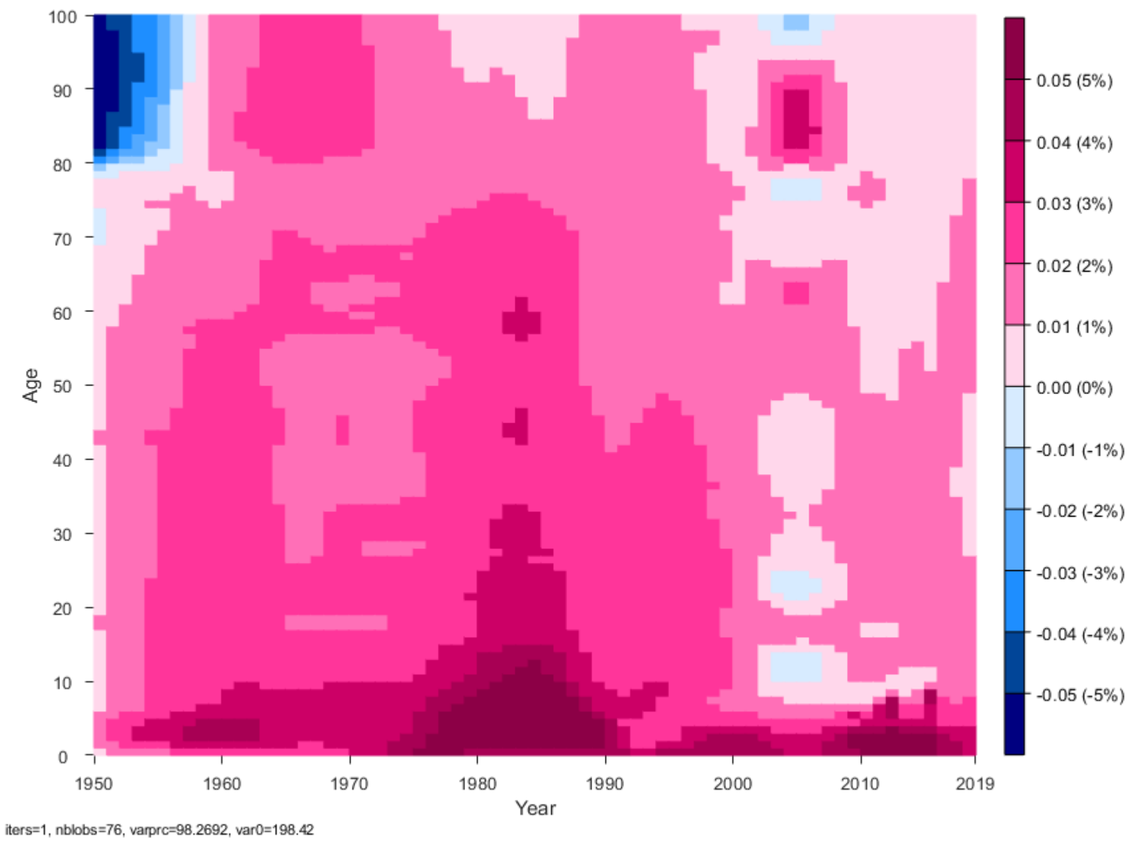
Females



iters=1, nblobs=62, varprc=97.8885, var0=97.3582

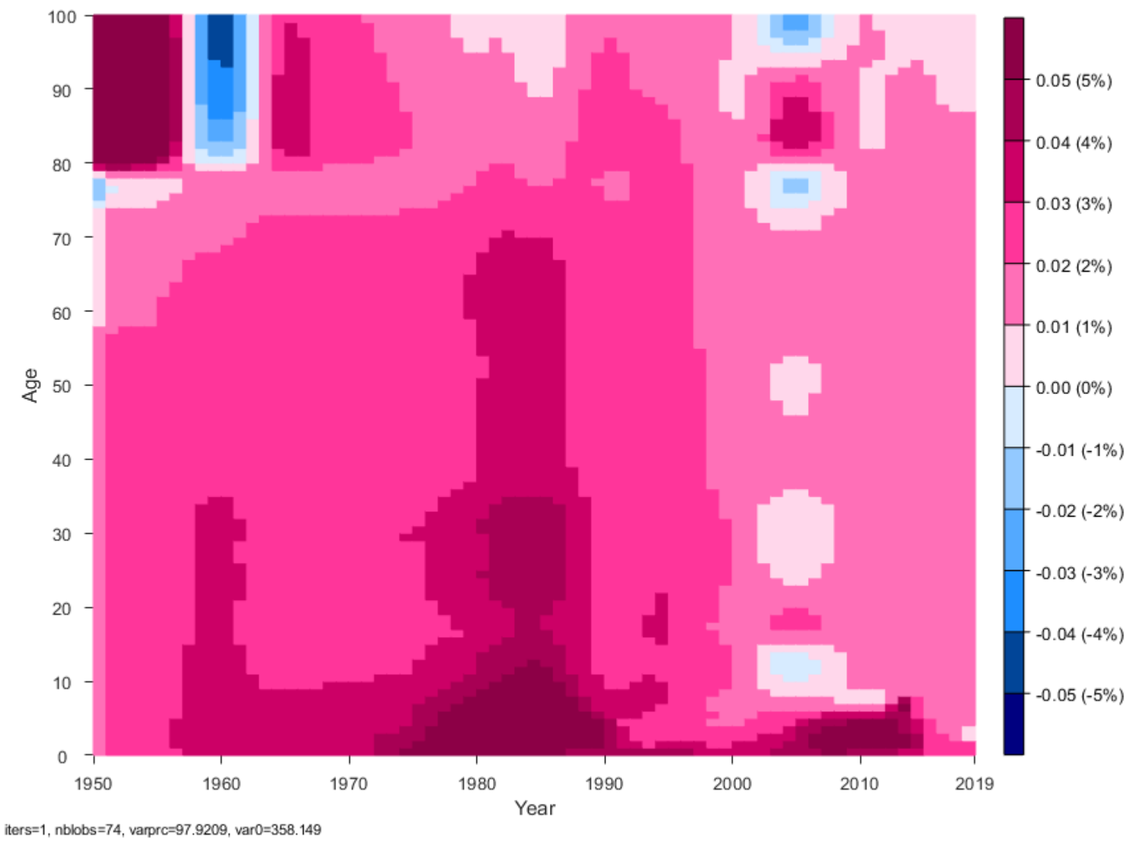
Honduras

Males



iters=1, nblobs=76, varprc=98.2692, var0=198.42

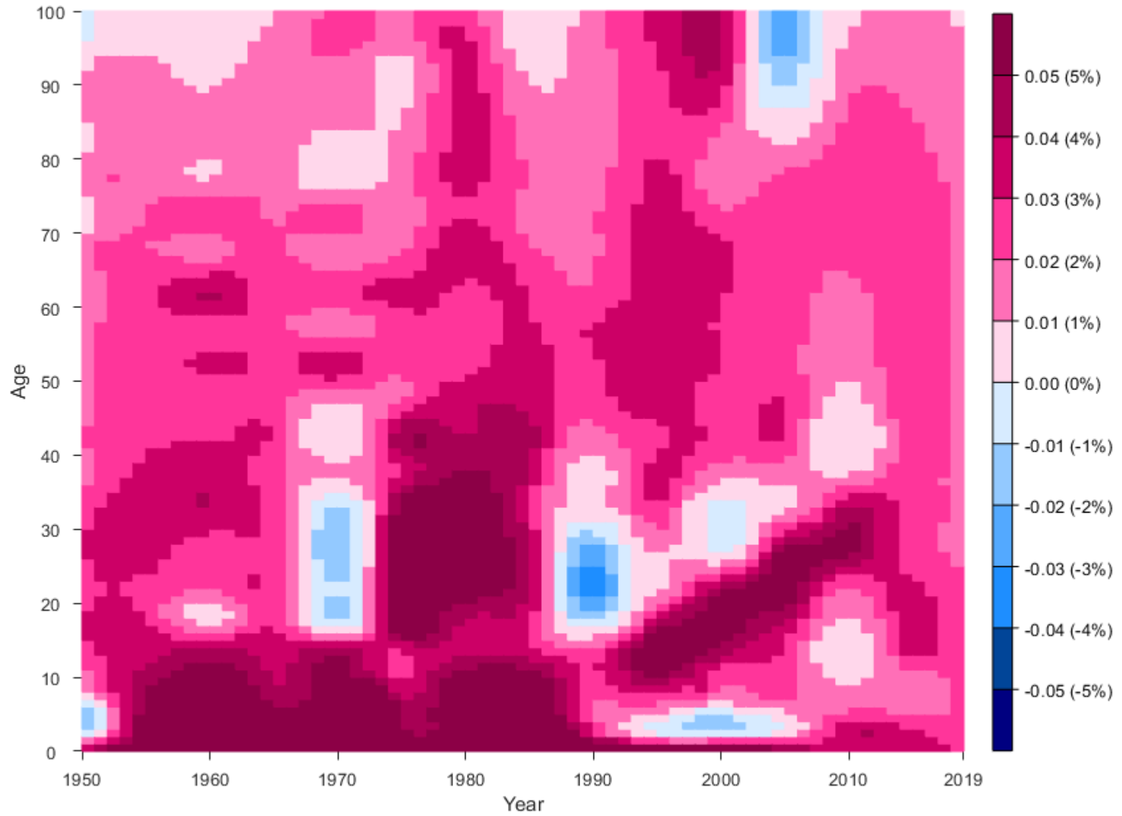
Females



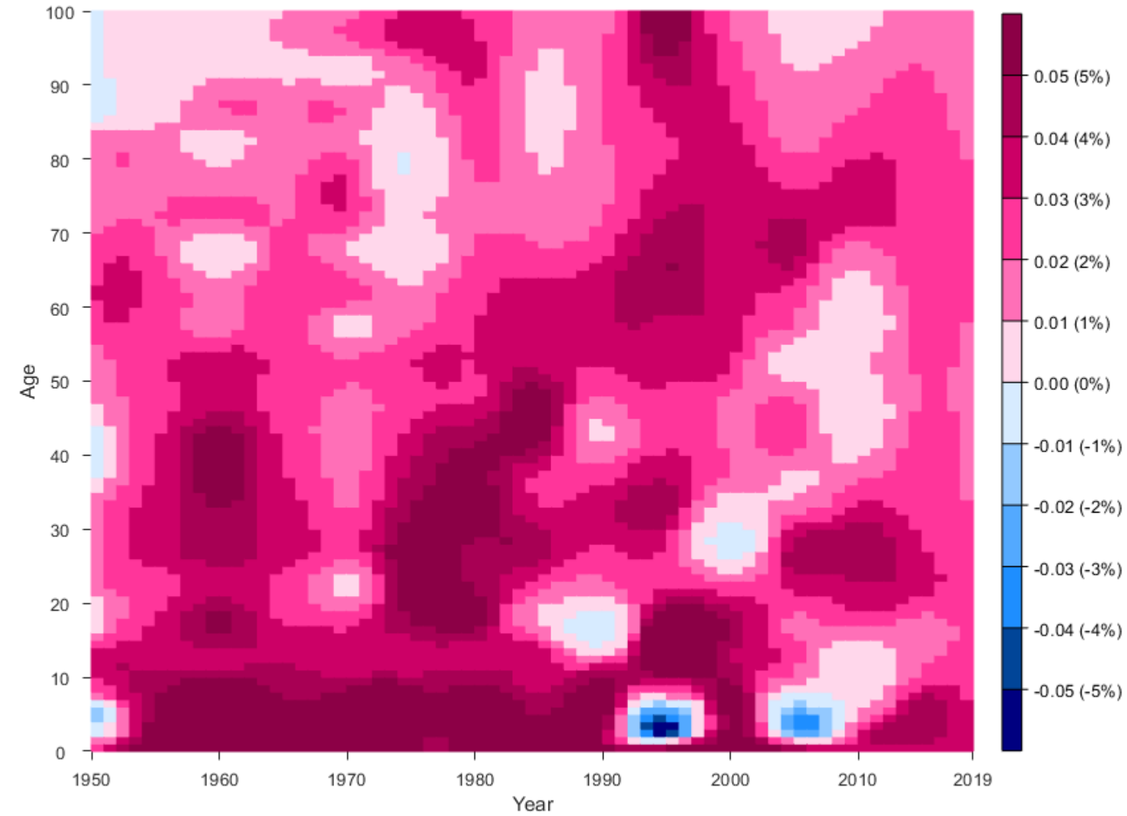
iters=1, nblobs=74, varprc=97.9209, var0=358.149

China, Hong Kong SAR

Males

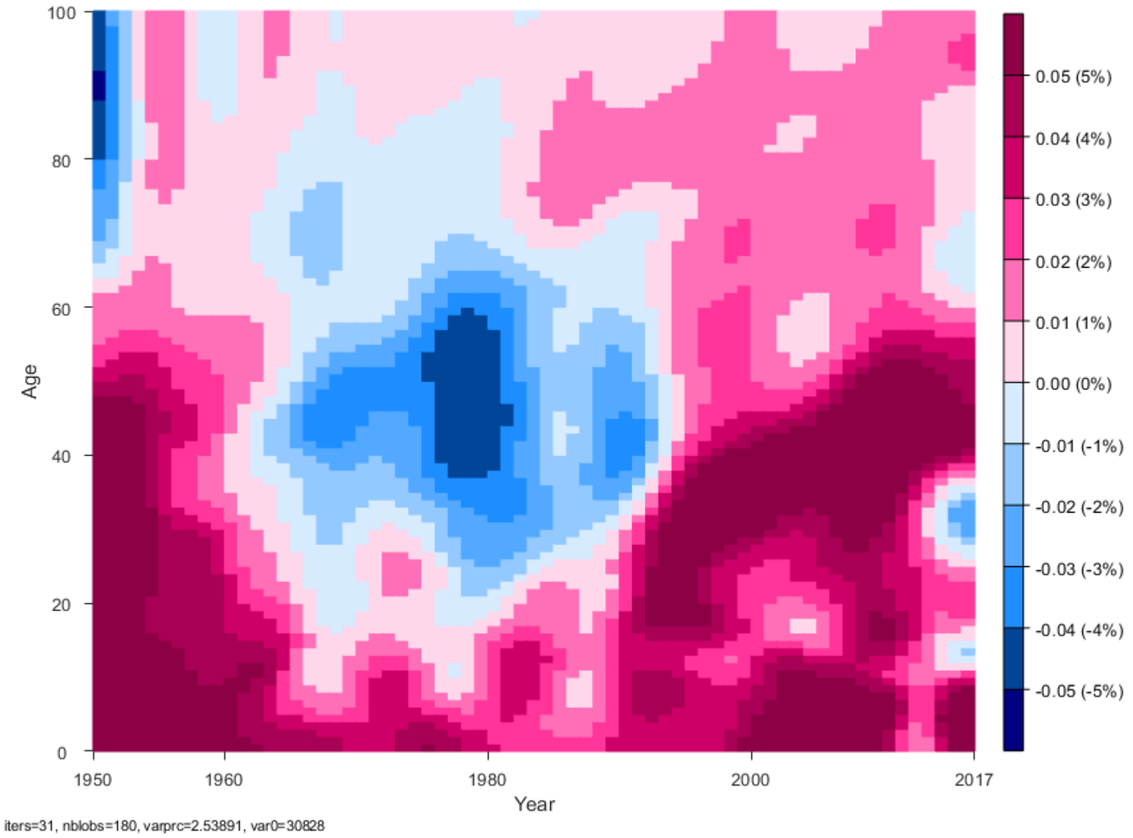


Females

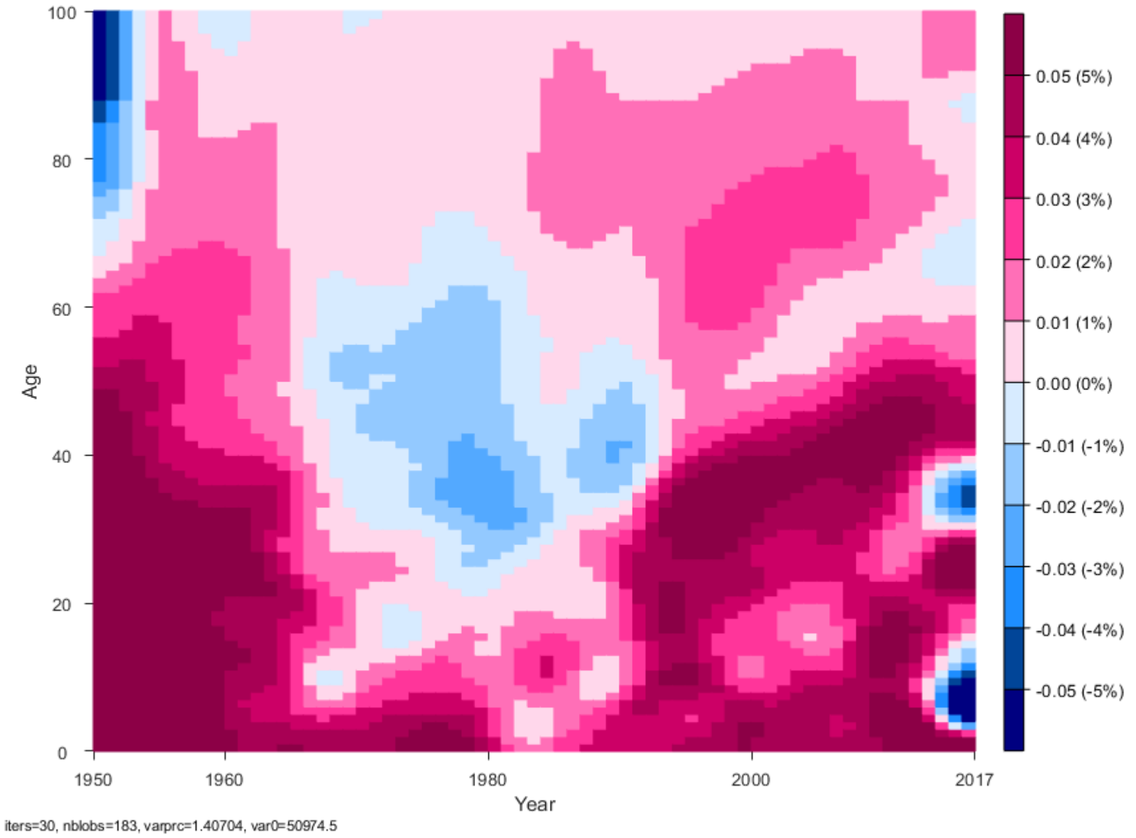


Hungary

Males

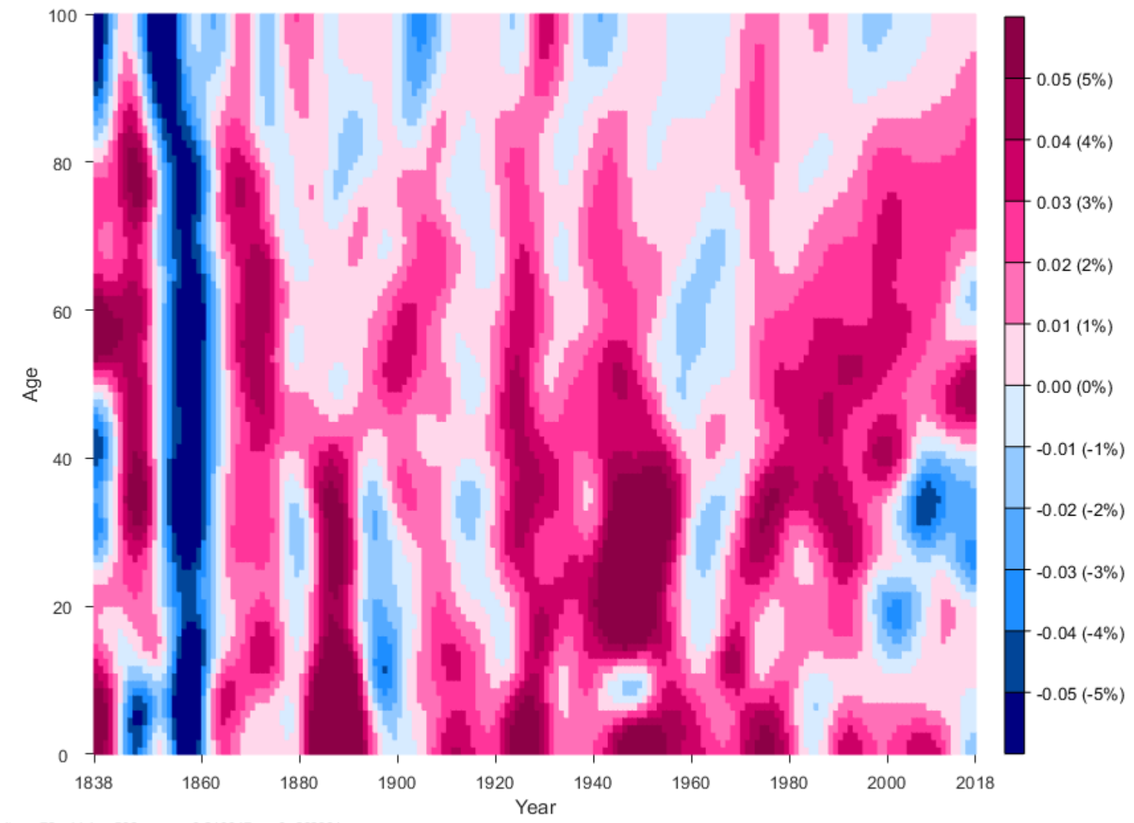


Females



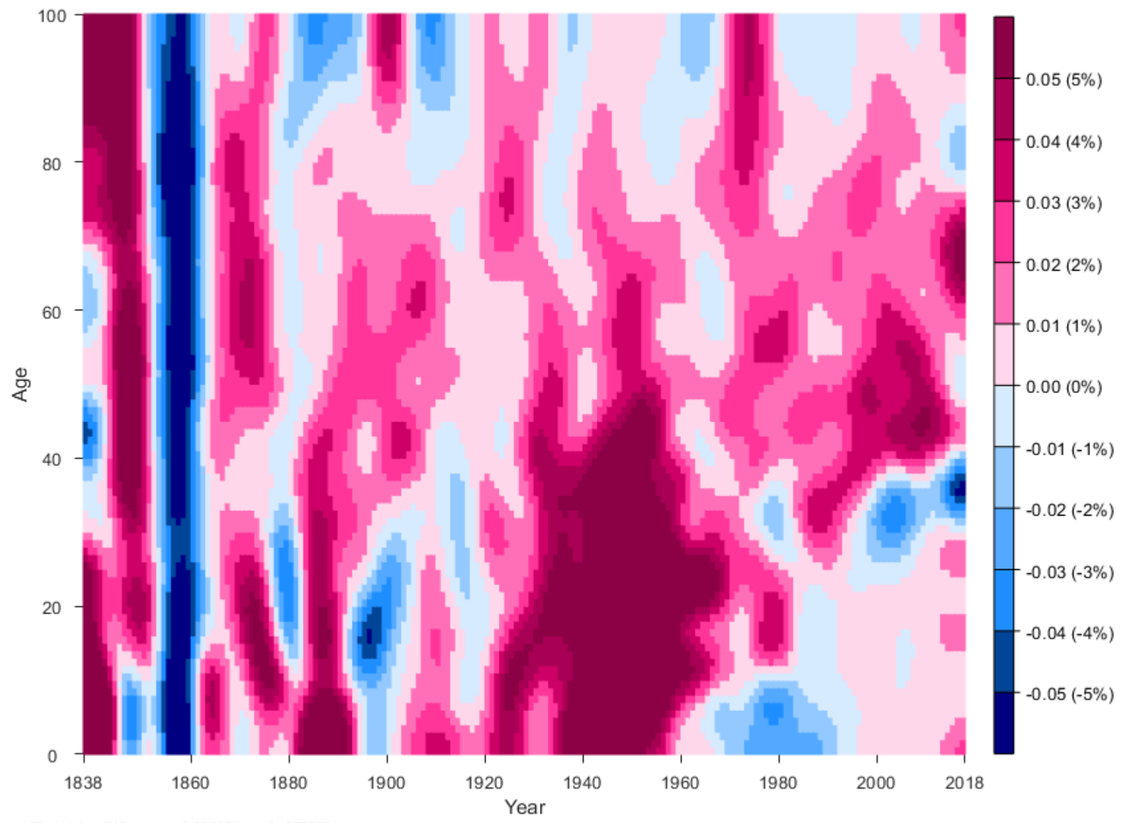
Iceland

Males



iters=72, nblobs=506, varprc=0.210047, var0=262961

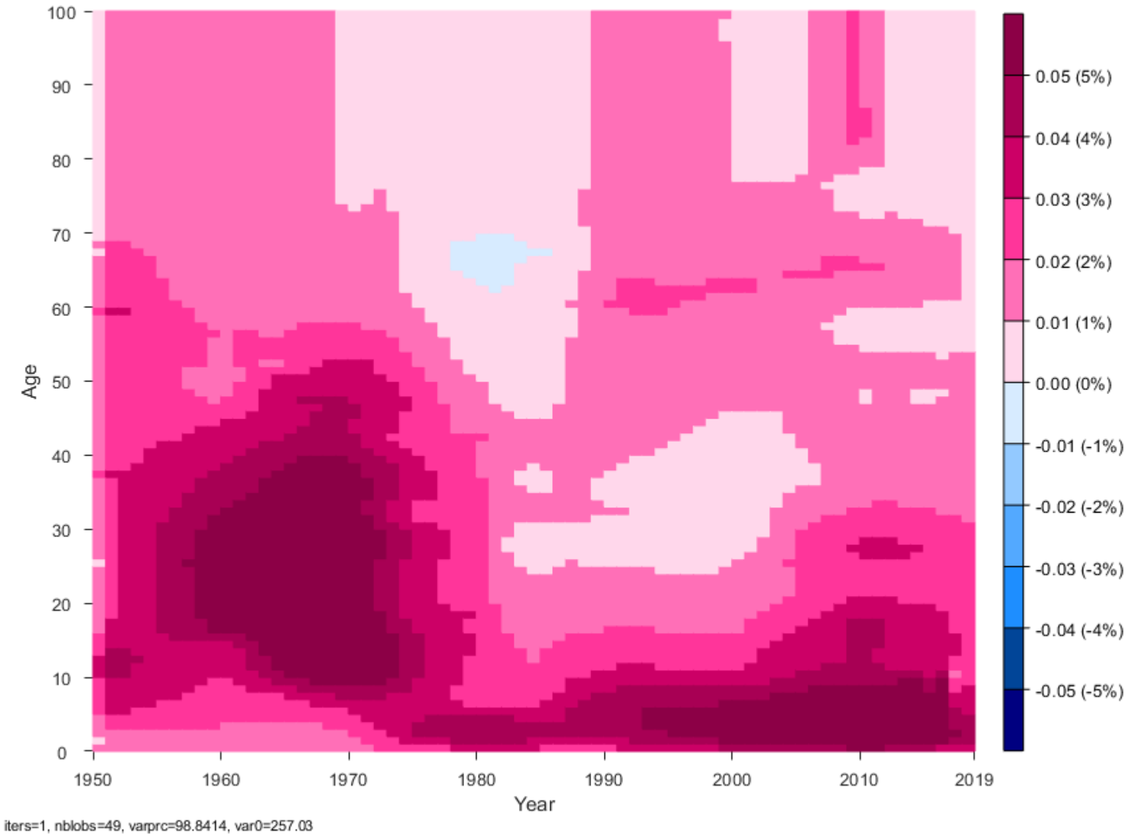
Females



iters=70, nblobs=510, varprc=0.300924, var0=256855

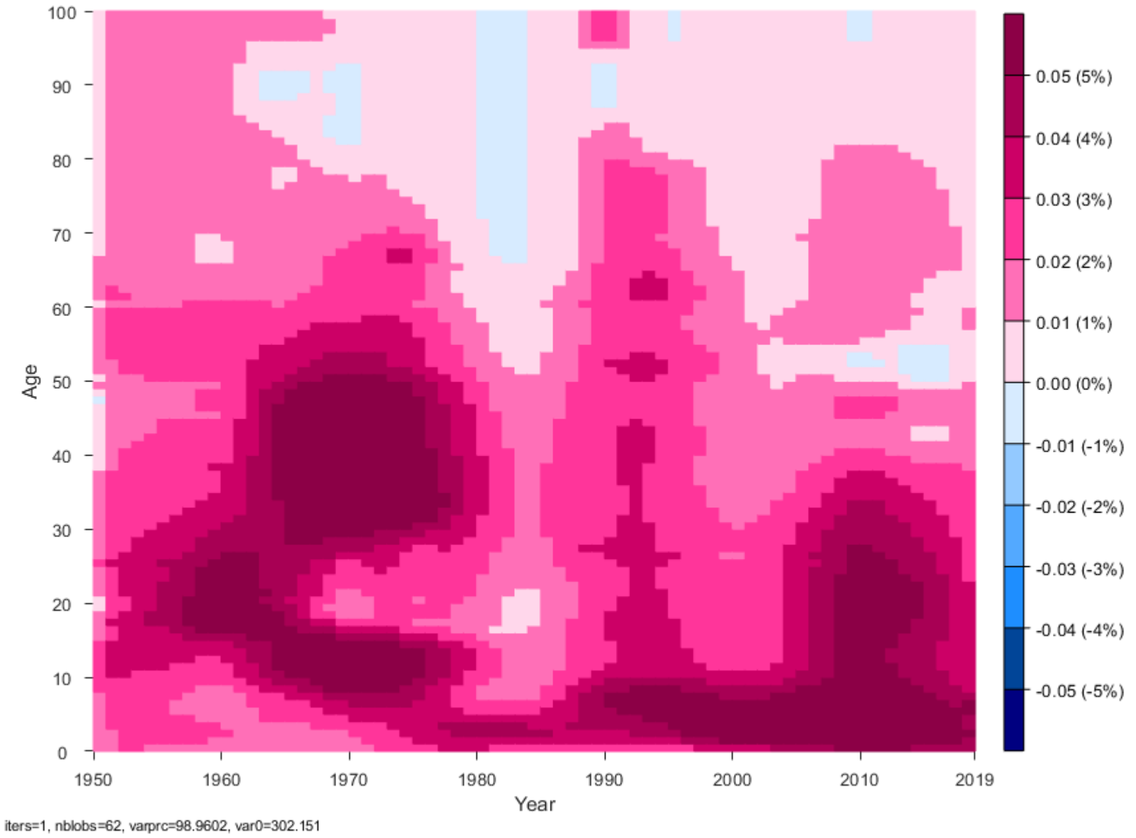
India

Males



iters=1, nblobs=49, varprc=98.8414, var0=257.03

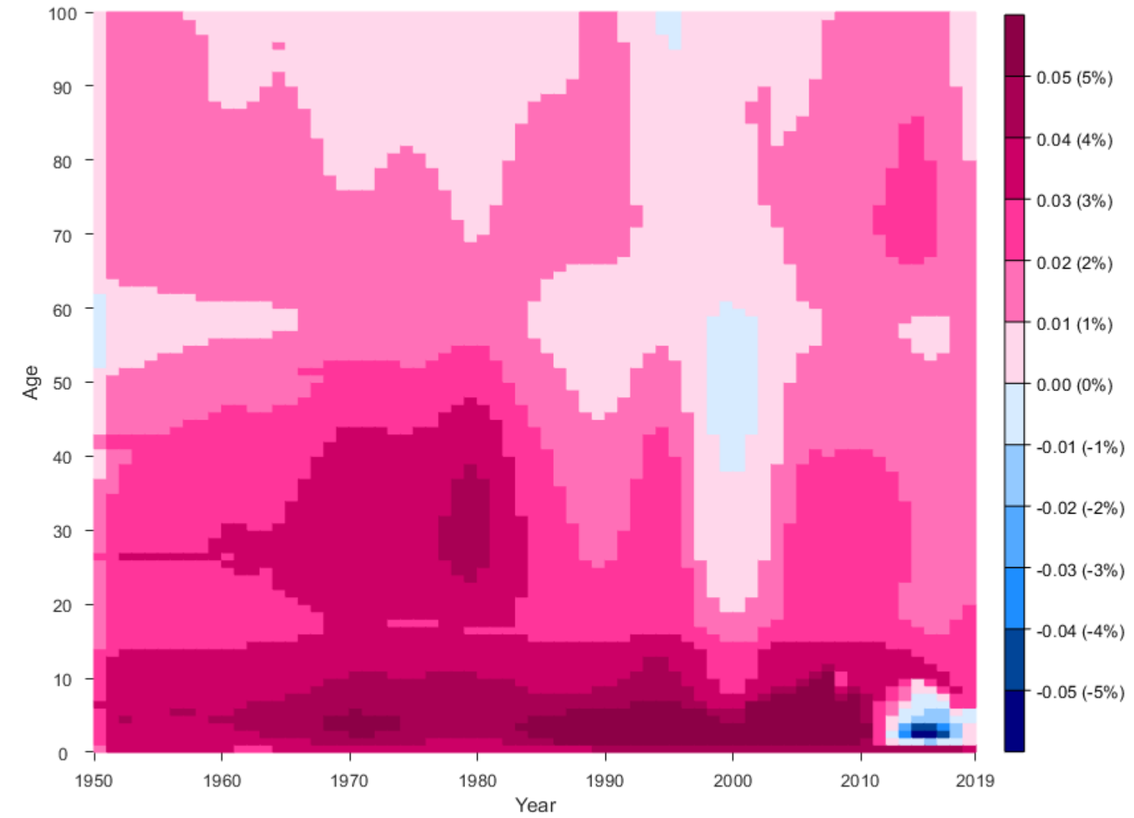
Females



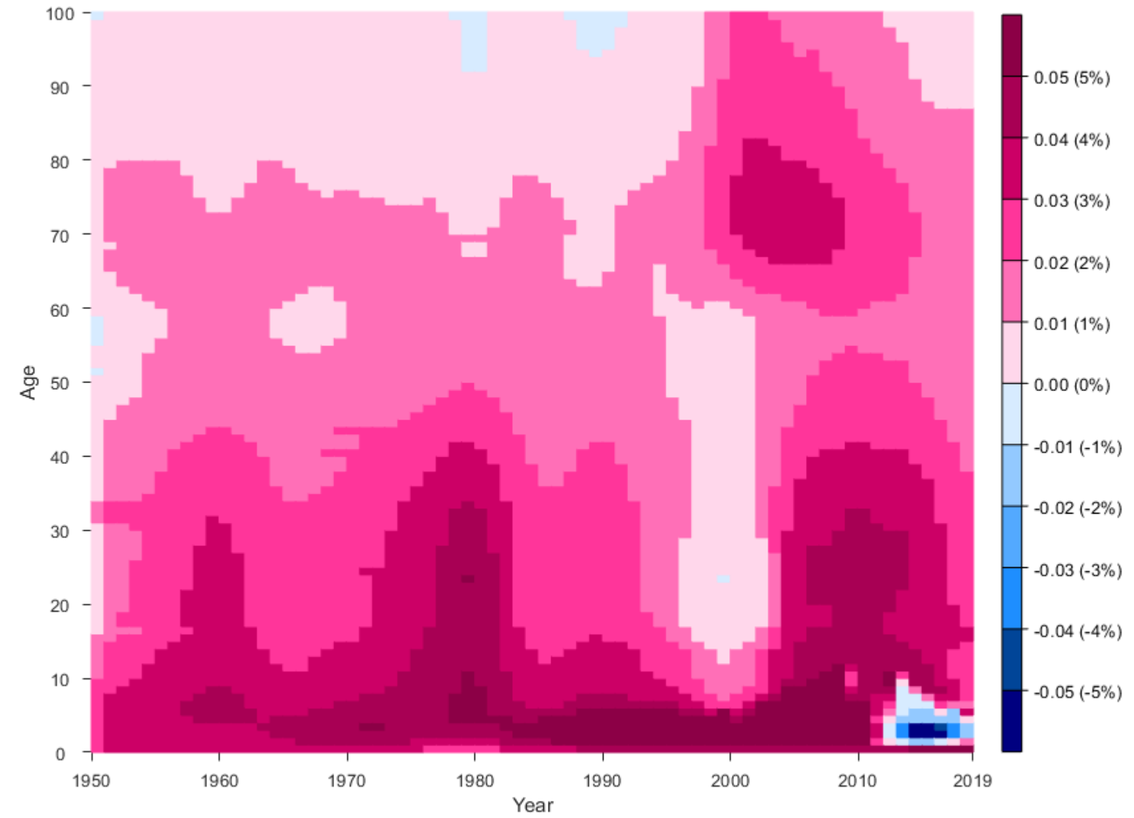
iters=1, nblobs=62, varprc=98.9602, var0=302.151

Indonesia

Males

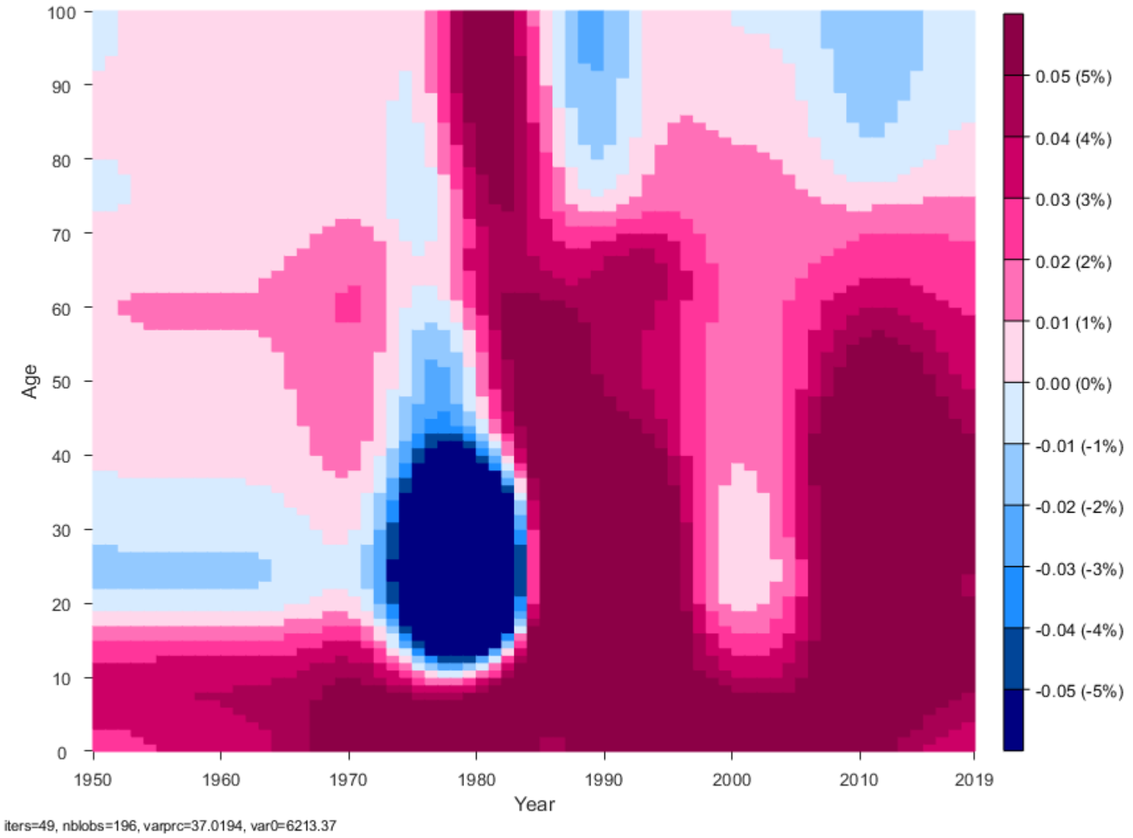


Females



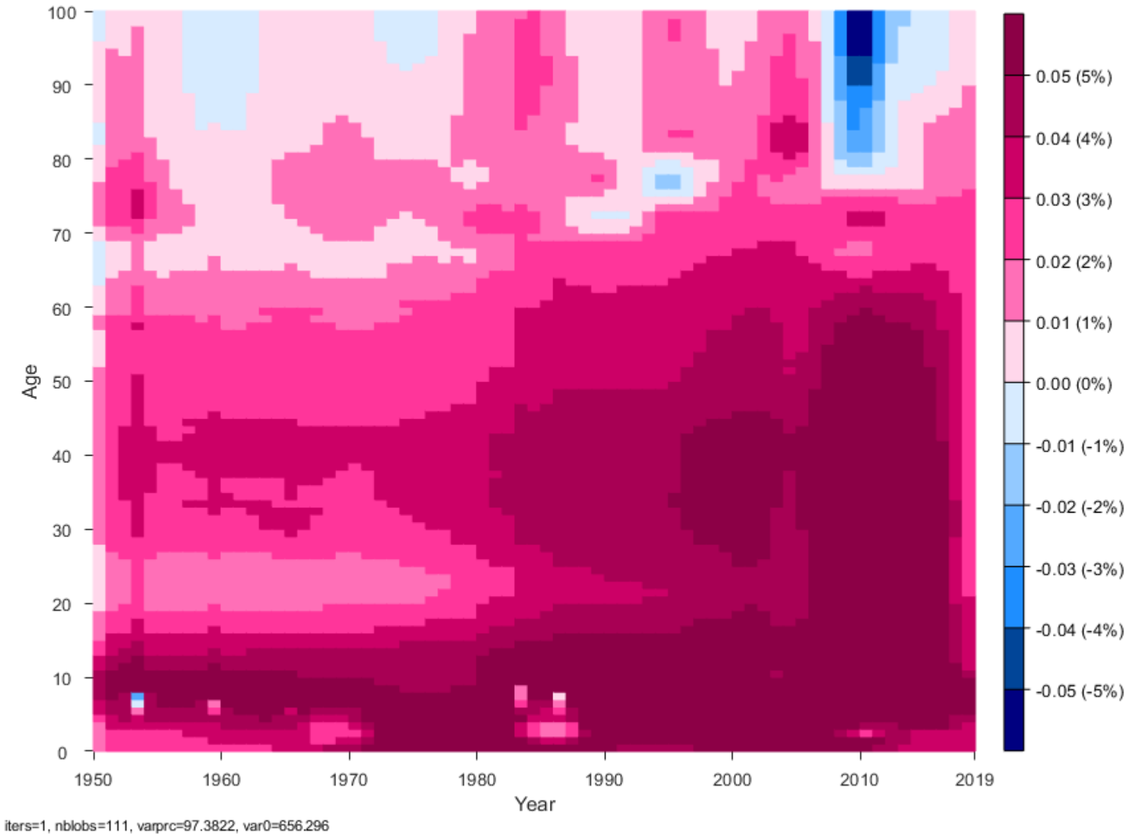
Iran (Islamic Republic of)

Males



iters=49, nblobs=196, varprc=37.0194, var0=6213.37

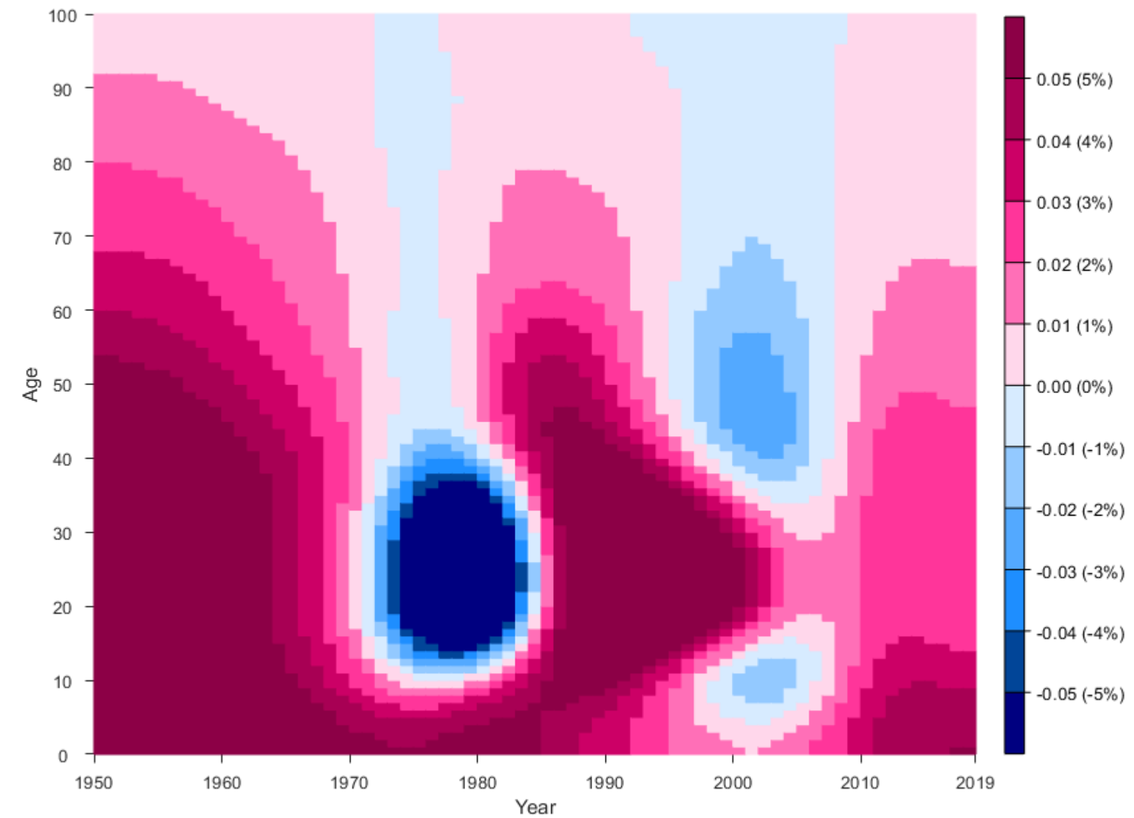
Females



iters=1, nblobs=111, varprc=97.3822, var0=656.296

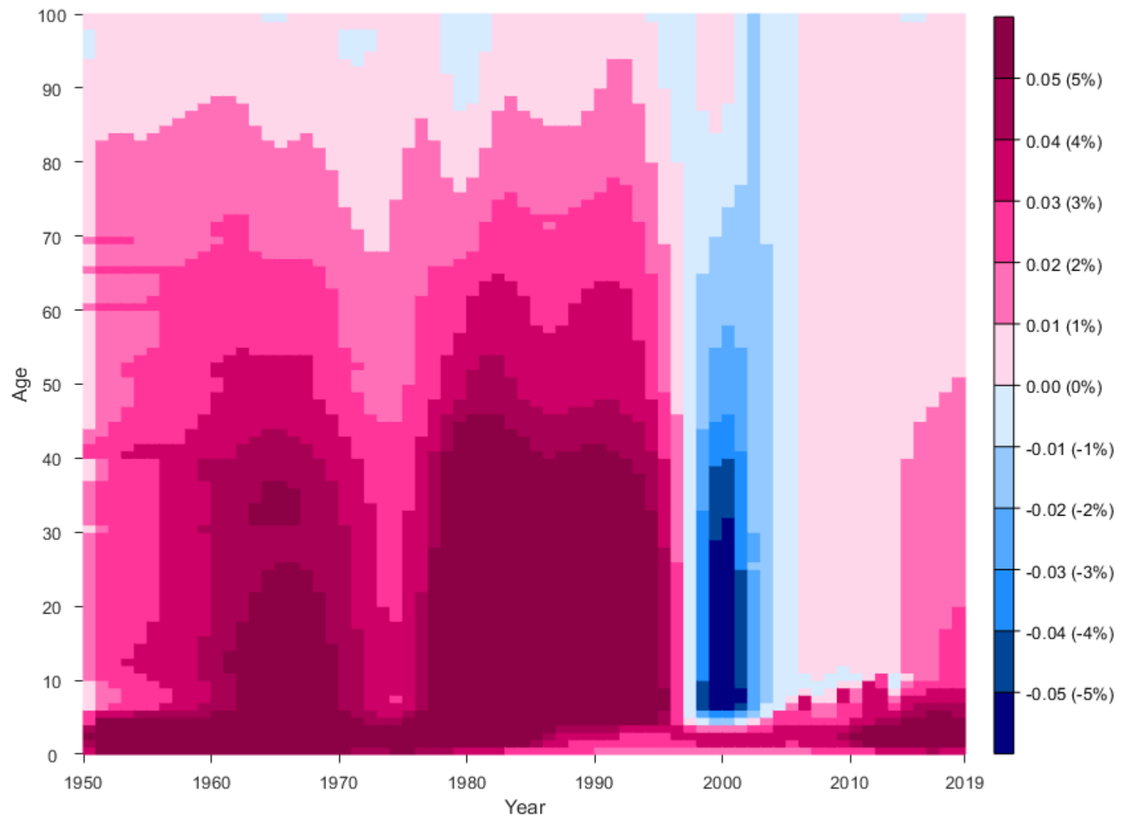
Iraq

Males



iters=99, nblobs=193, varprc=24.935, var0=3835.41

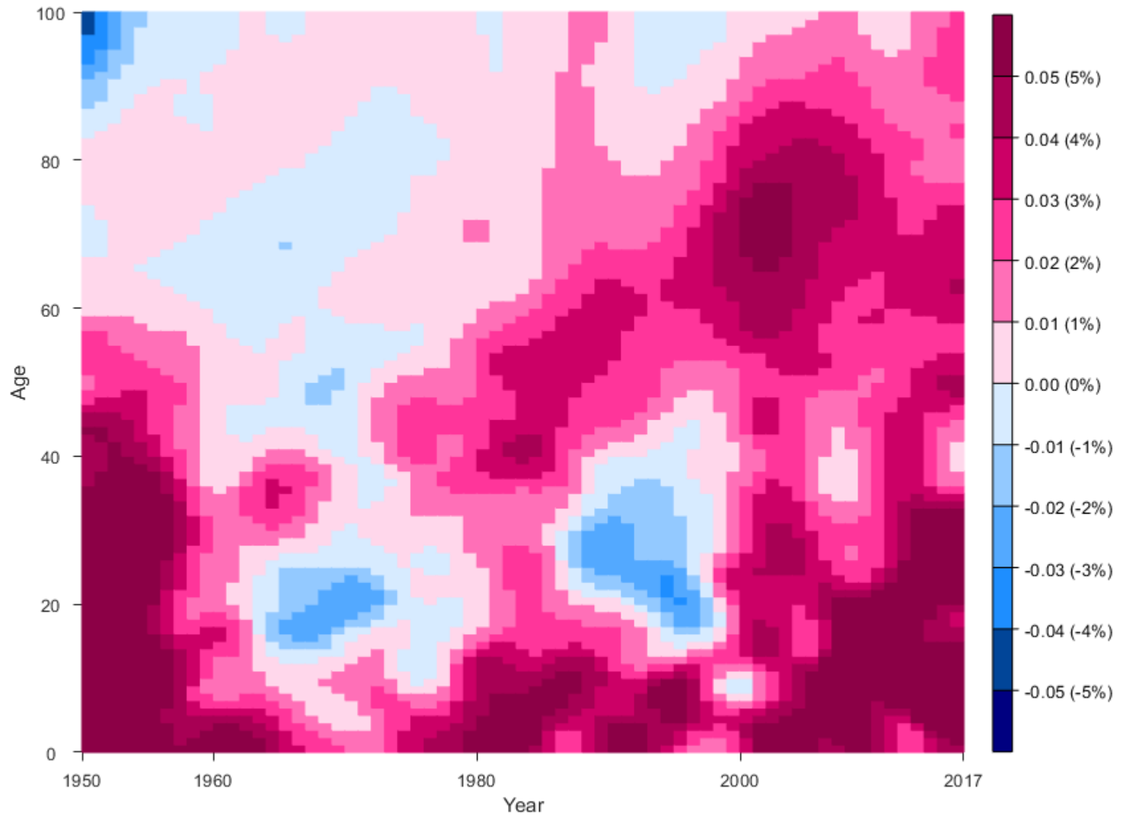
Females



iters=1, nblobs=116, varprc=98.5478, var0=656.152

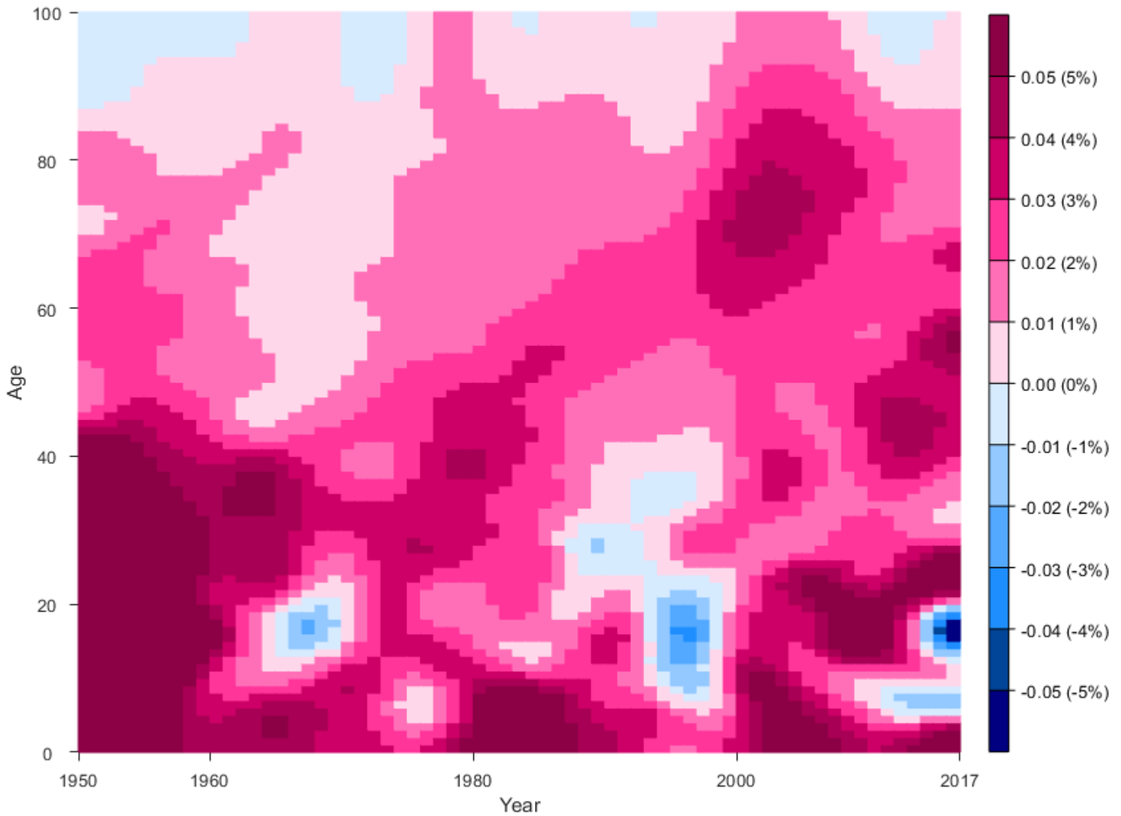
Ireland

Males



iters=29, nblobs=184, varprc=0.818288, var0=69269.8

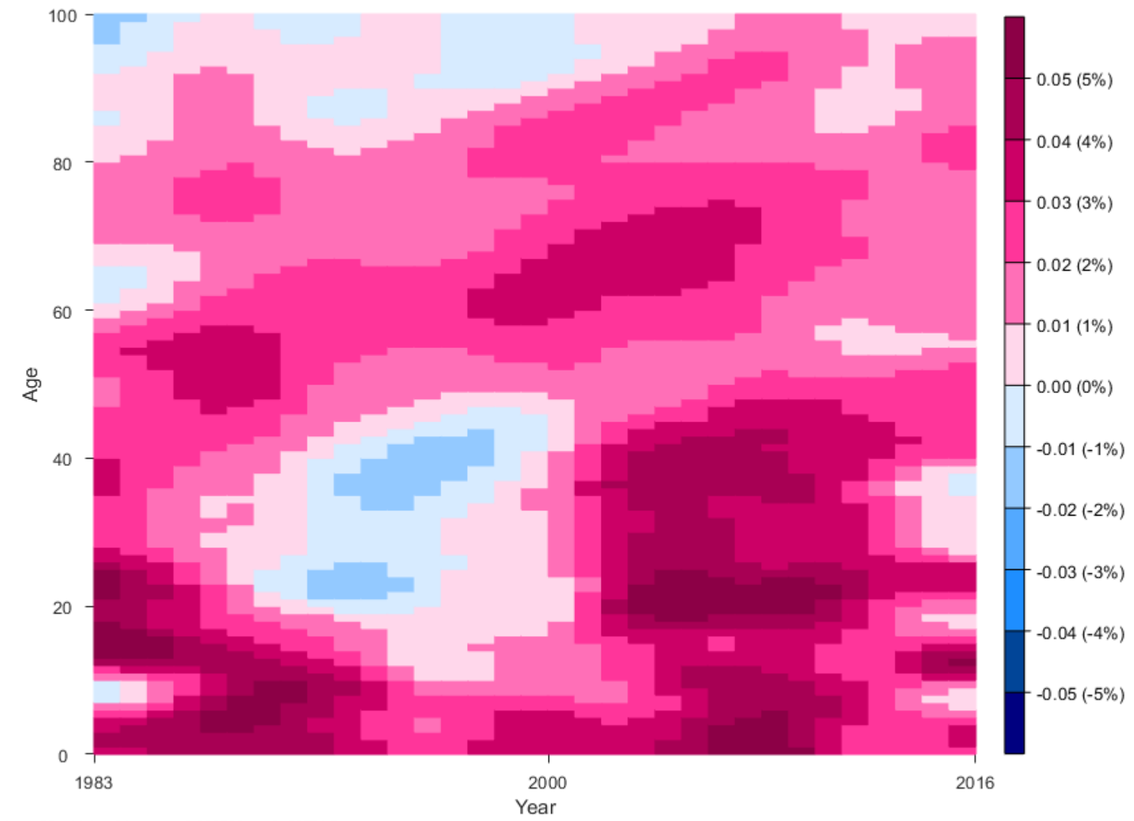
Females



iters=38, nblobs=182, varprc=0.600238, var0=114018

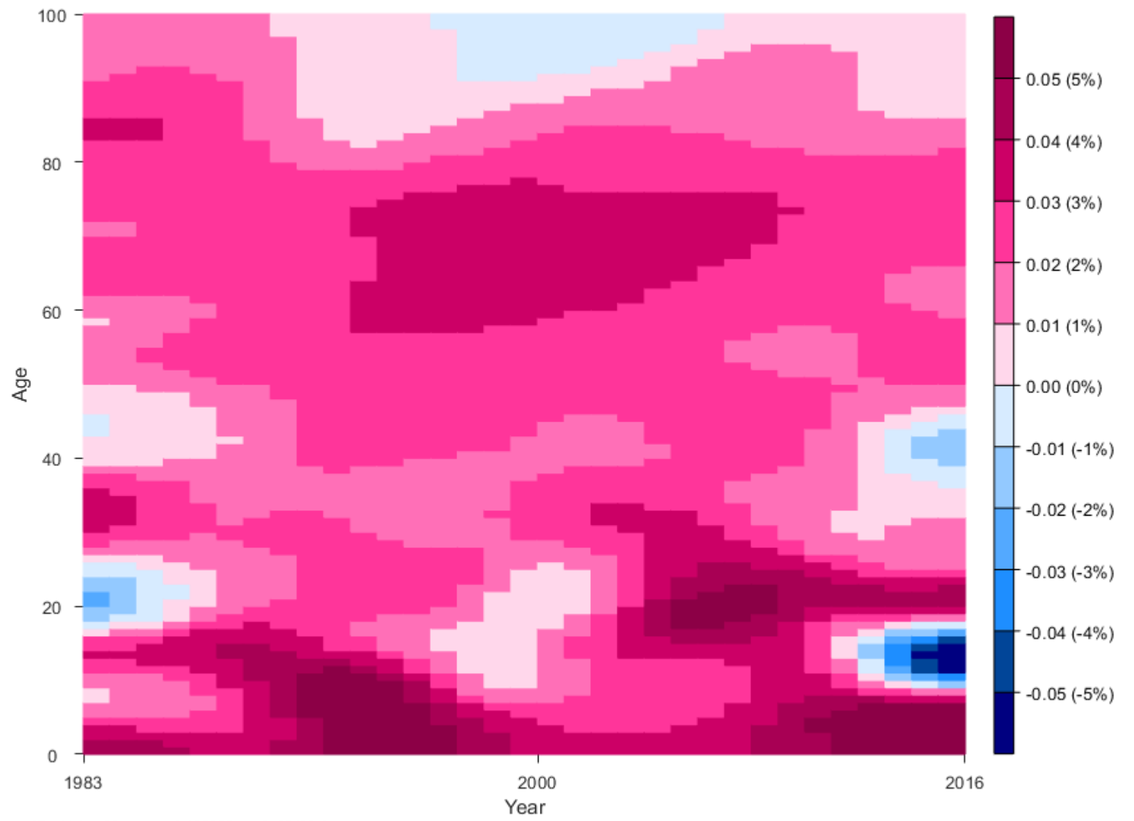
Israel

Males



iters=32, nblobs=94, varprc=0.383598, var0=53774.5

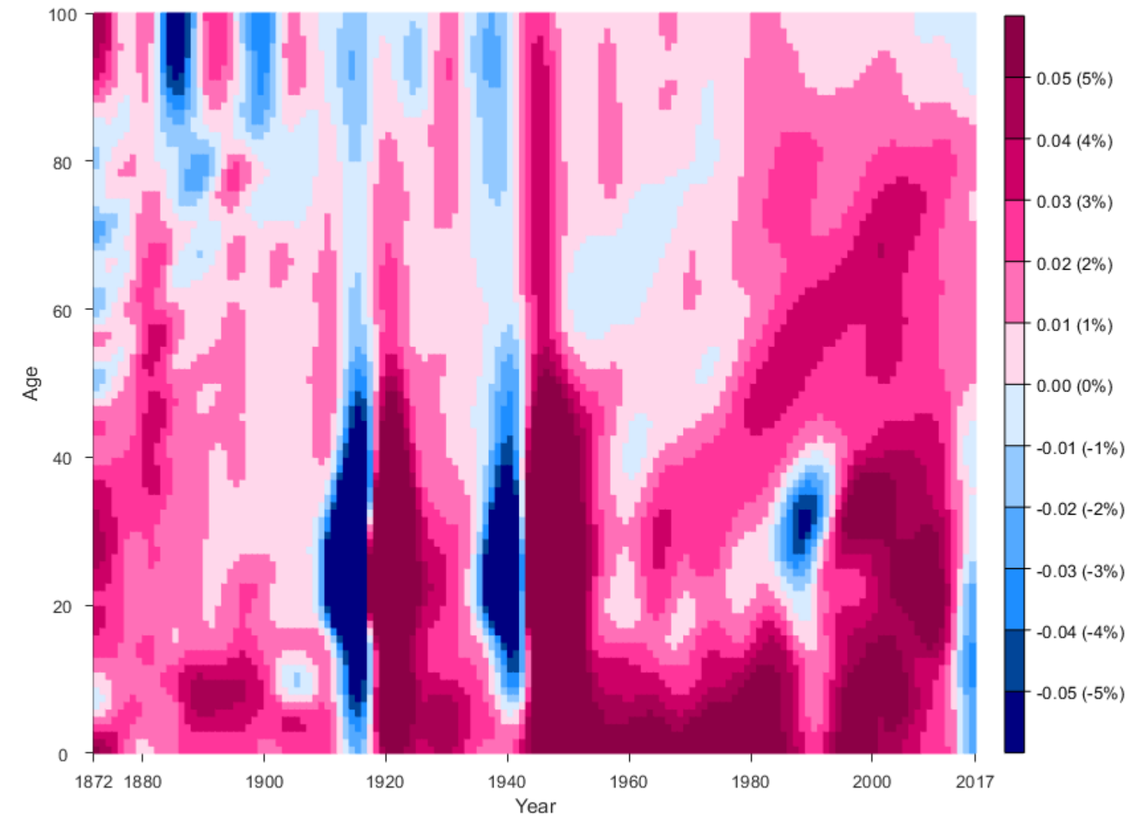
Females



iters=47, nblobs=93, varprc=0.195925, var0=92439.4

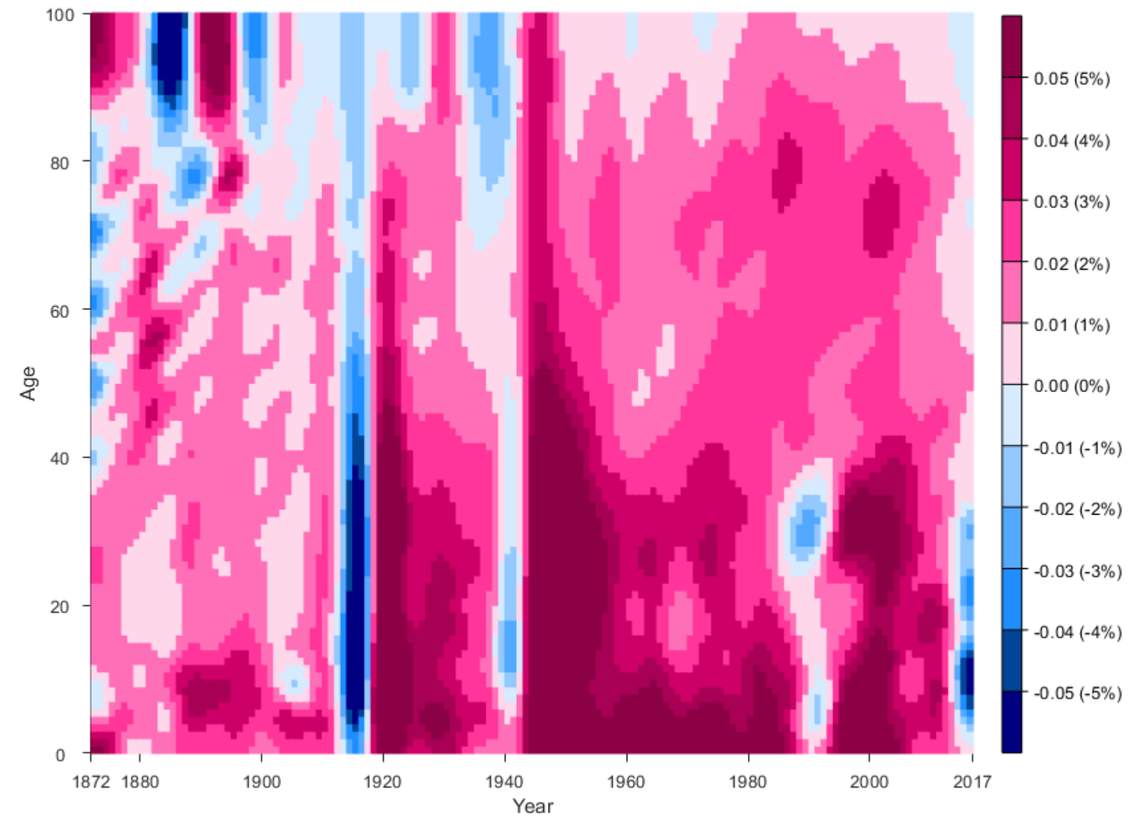
Italy

Males



iters=35, nblobs=409, varprc=5.57208, var0=24073.5

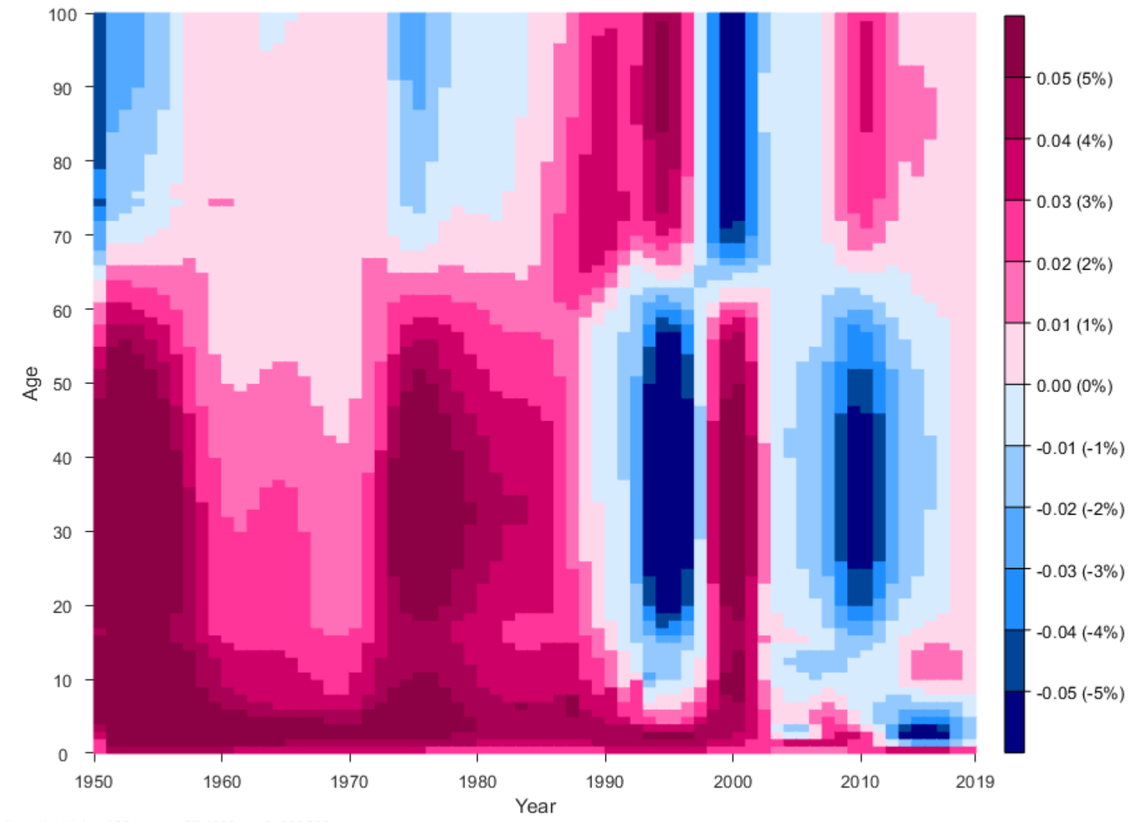
Females



iters=30, nblobs=410, varprc=3.09138, var0=20929.5

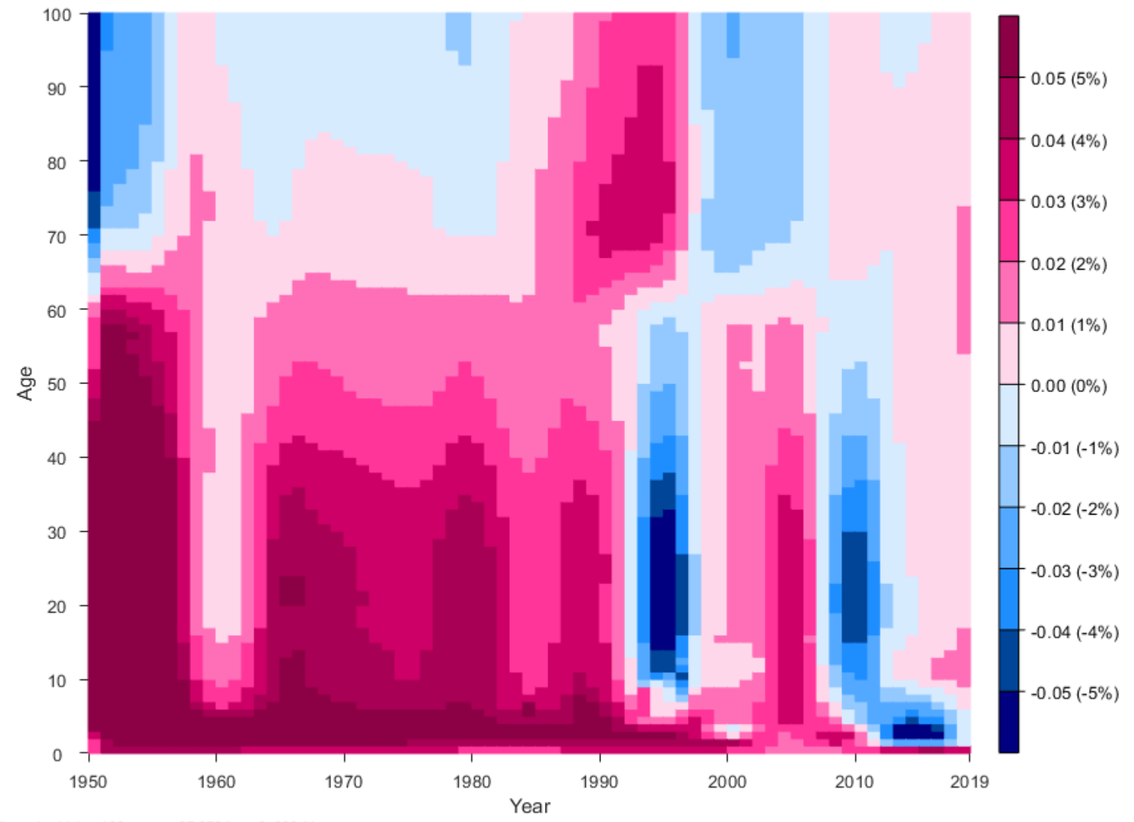
Jamaica

Males



iters=1, nblobs=190, varprc=97.1933, var0=888.807

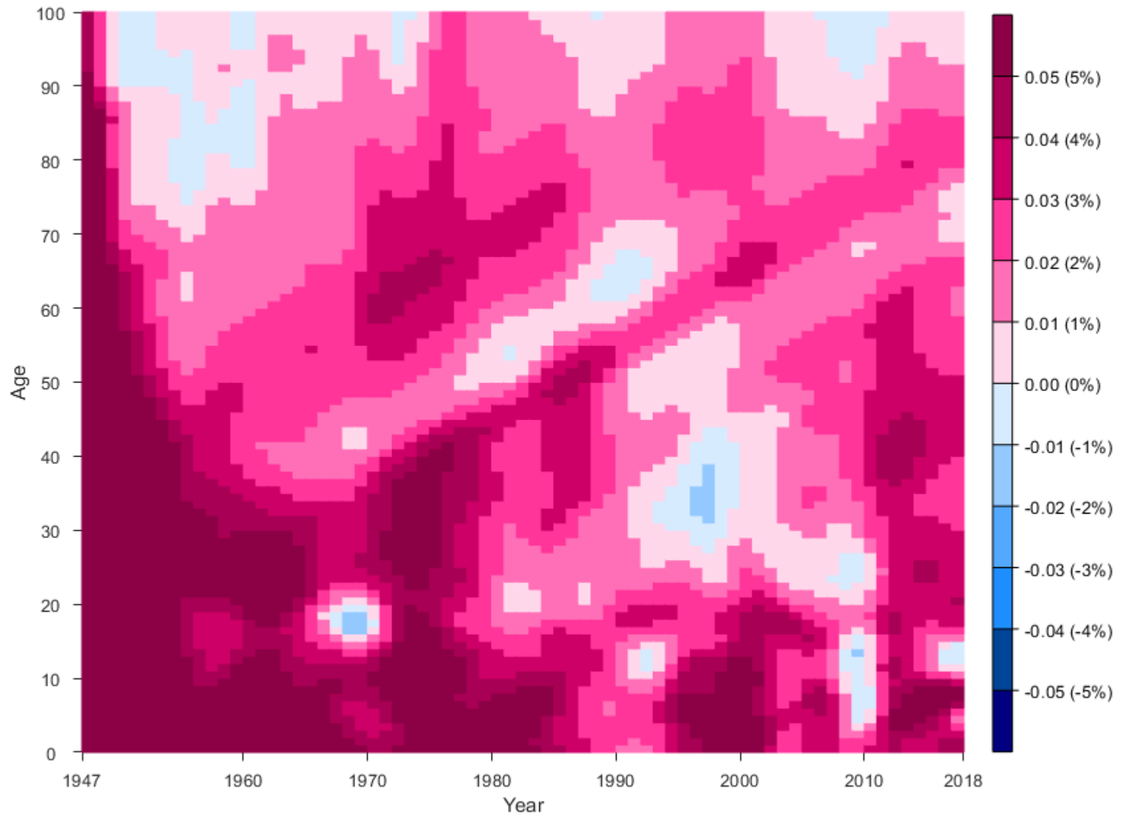
Females



iters=1, nblobs=166, varprc=97.8784, var0=888.41

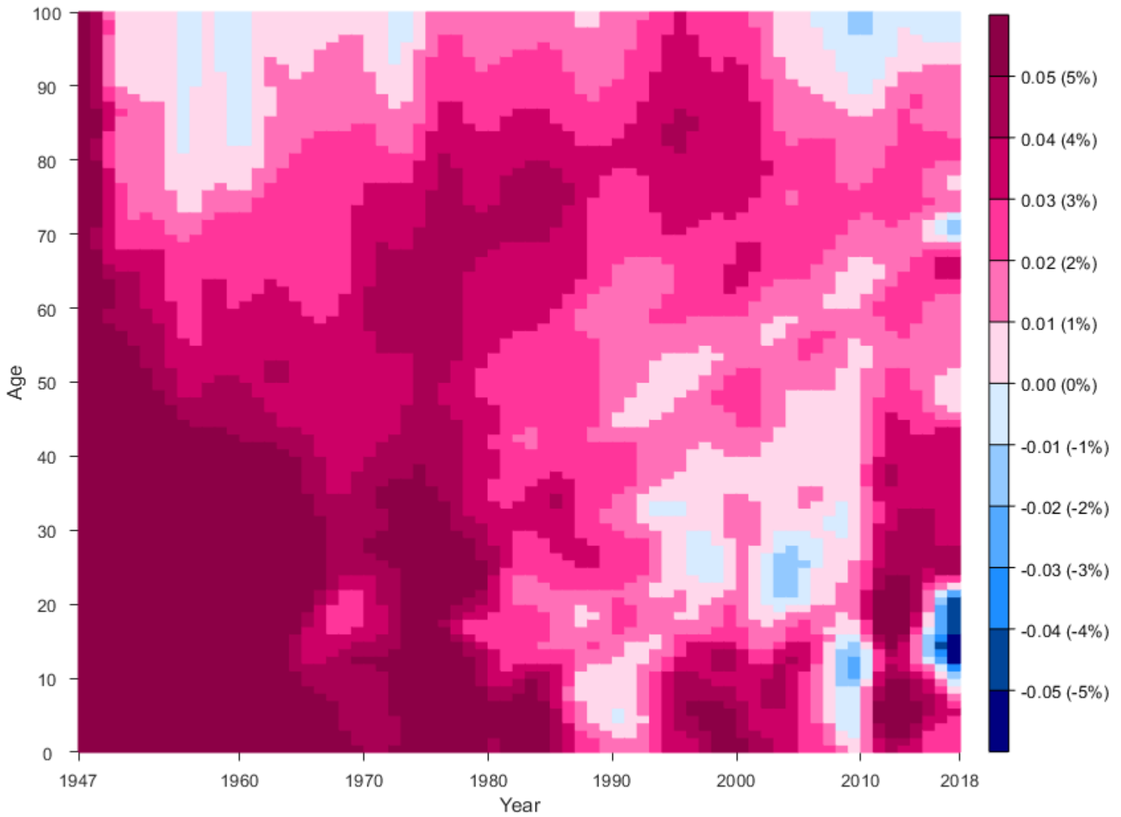
Japan

Males



iters=16, nblobs=194, varprc=13.326, var0=6396.63

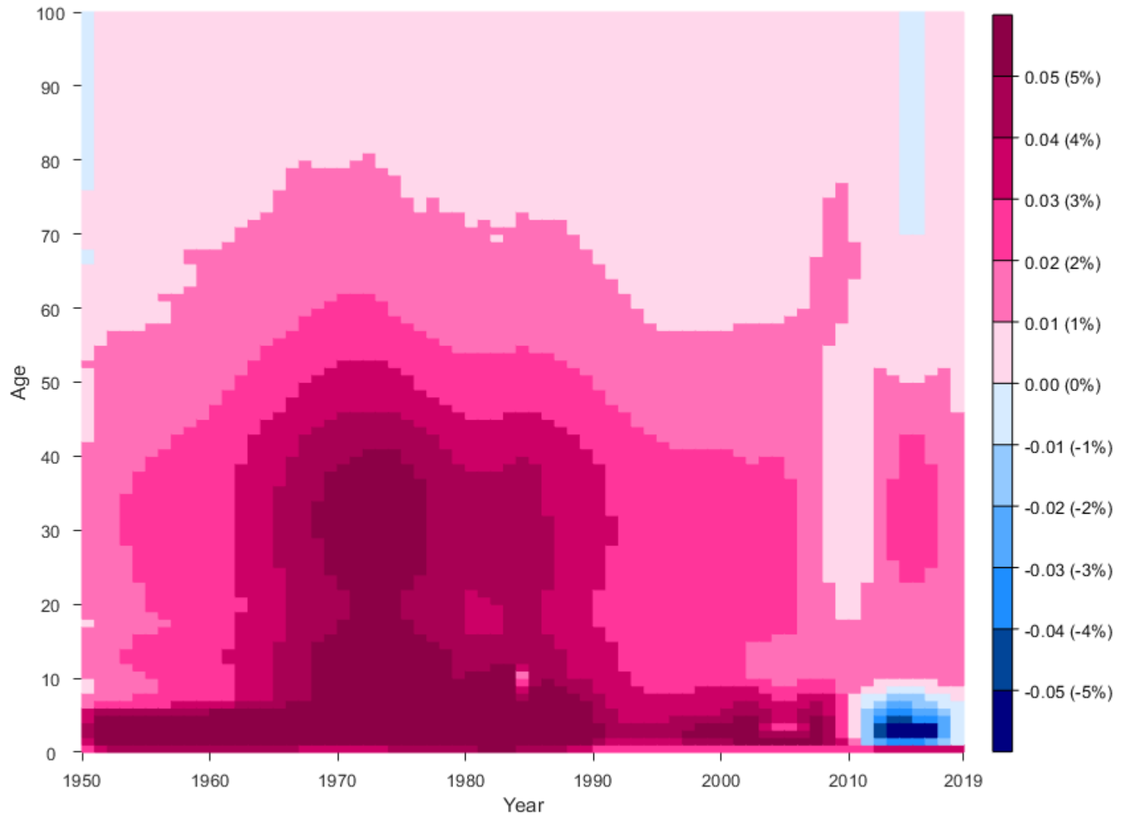
Females



iters=16, nblobs=183, varprc=11.4257, var0=9148.89

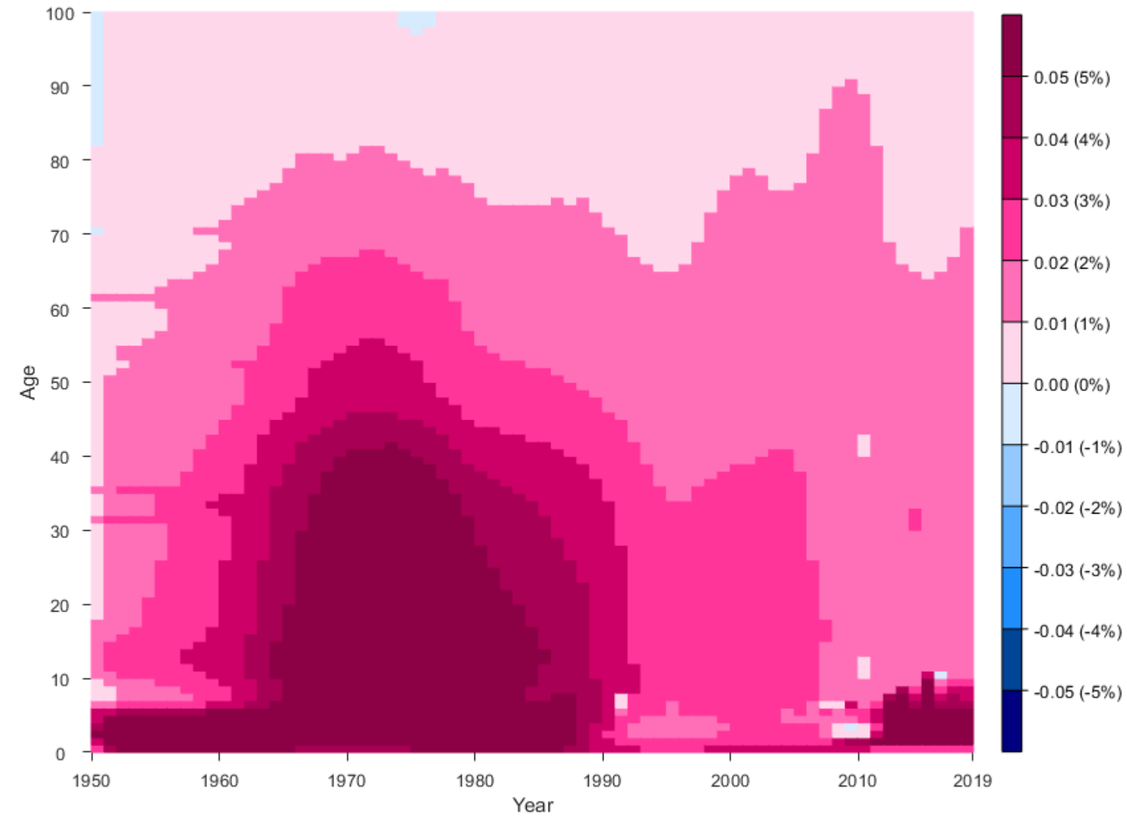
Jordan

Males



iters=1, nblobs=70, varprc=97.864, var0=356.453

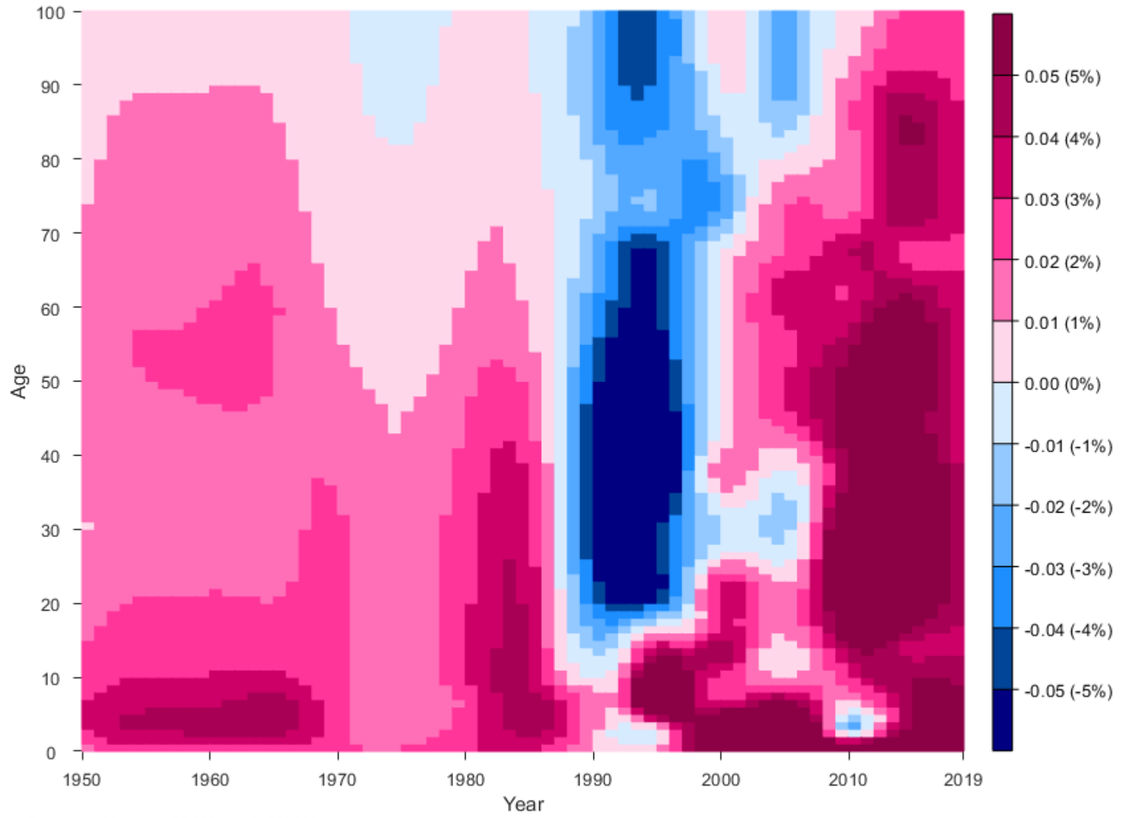
Females



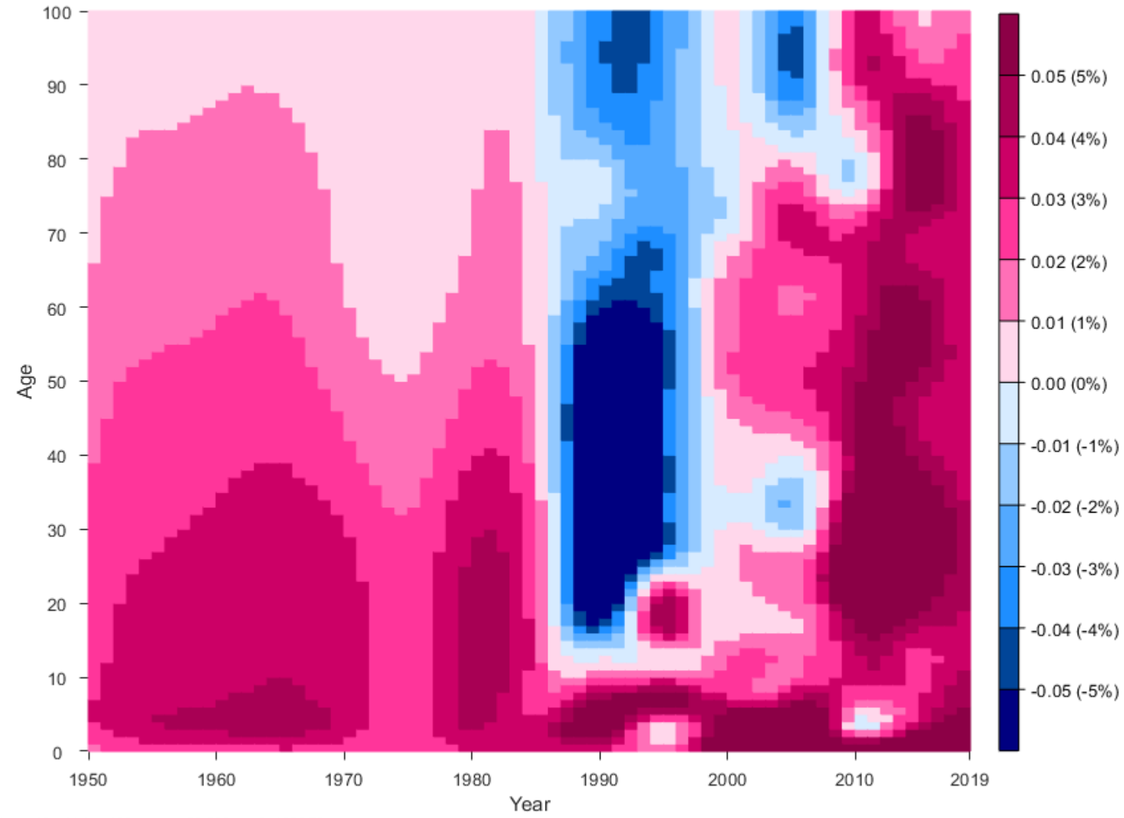
iters=1, nblobs=57, varprc=98.4037, var0=385.07

Kazakhstan

Males

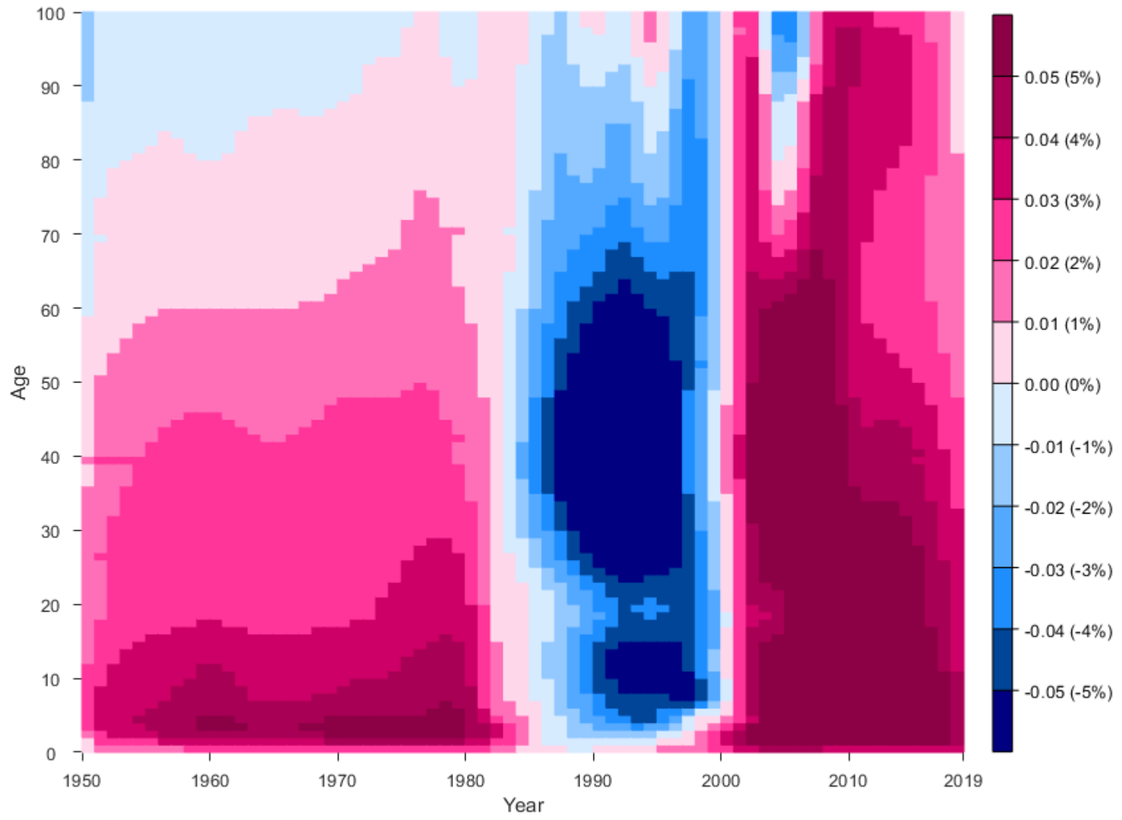


Females



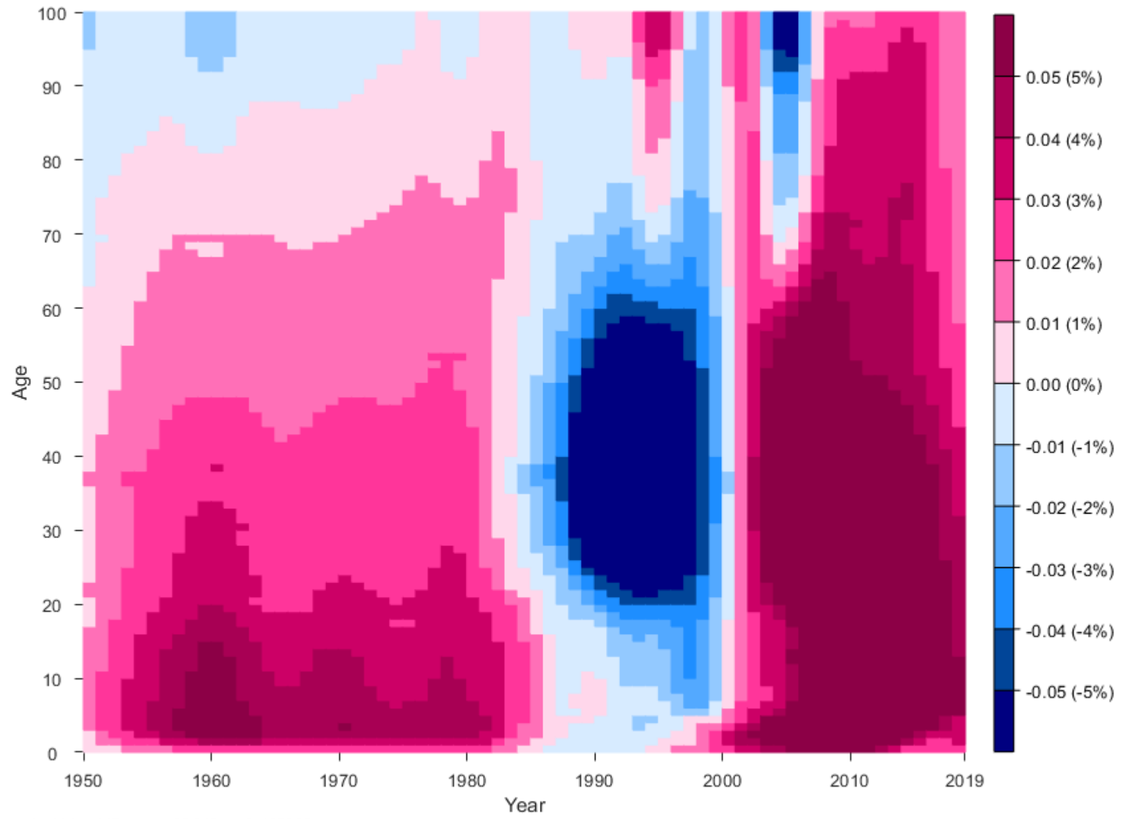
Kenya

Males



iters=1, nblobs=137, varprc=98.8349, var0=1259.02

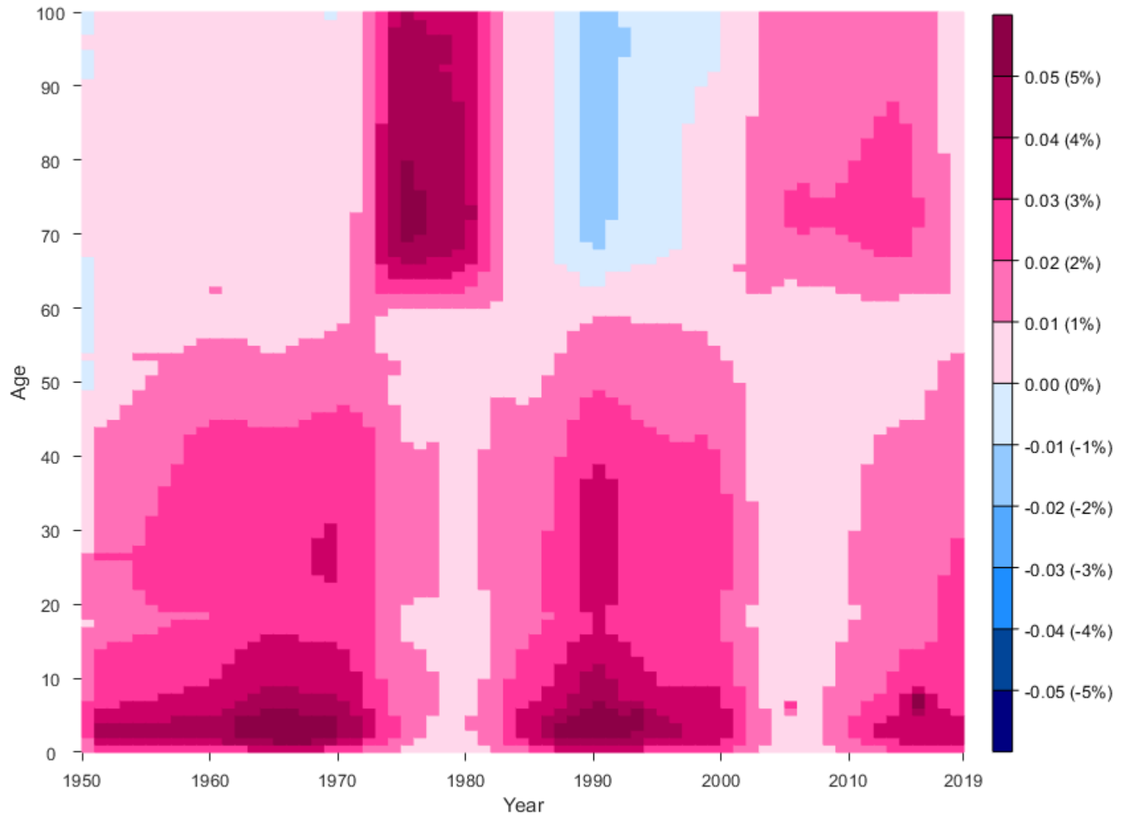
Females



iters=1, nblobs=147, varprc=98.842, var0=1270.36

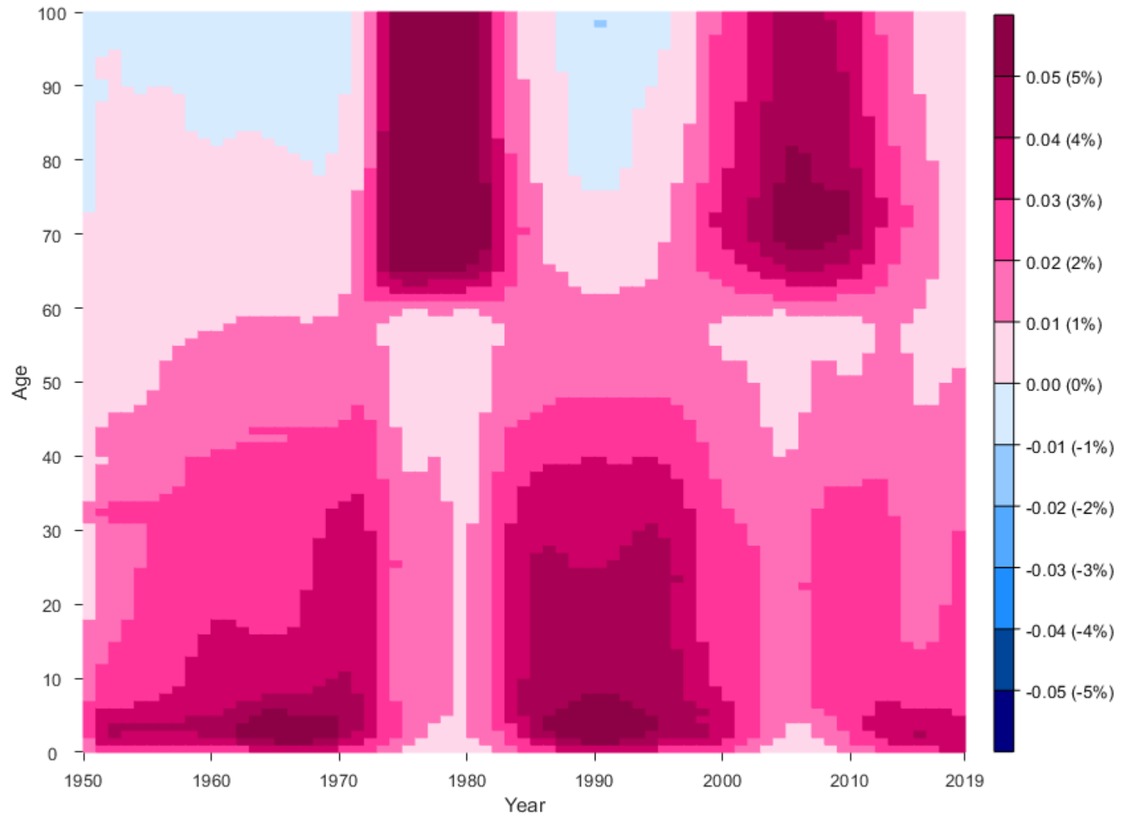
Kiribati

Males



iters=1, nblobs=50, varprc=98.1782, var0=156.921

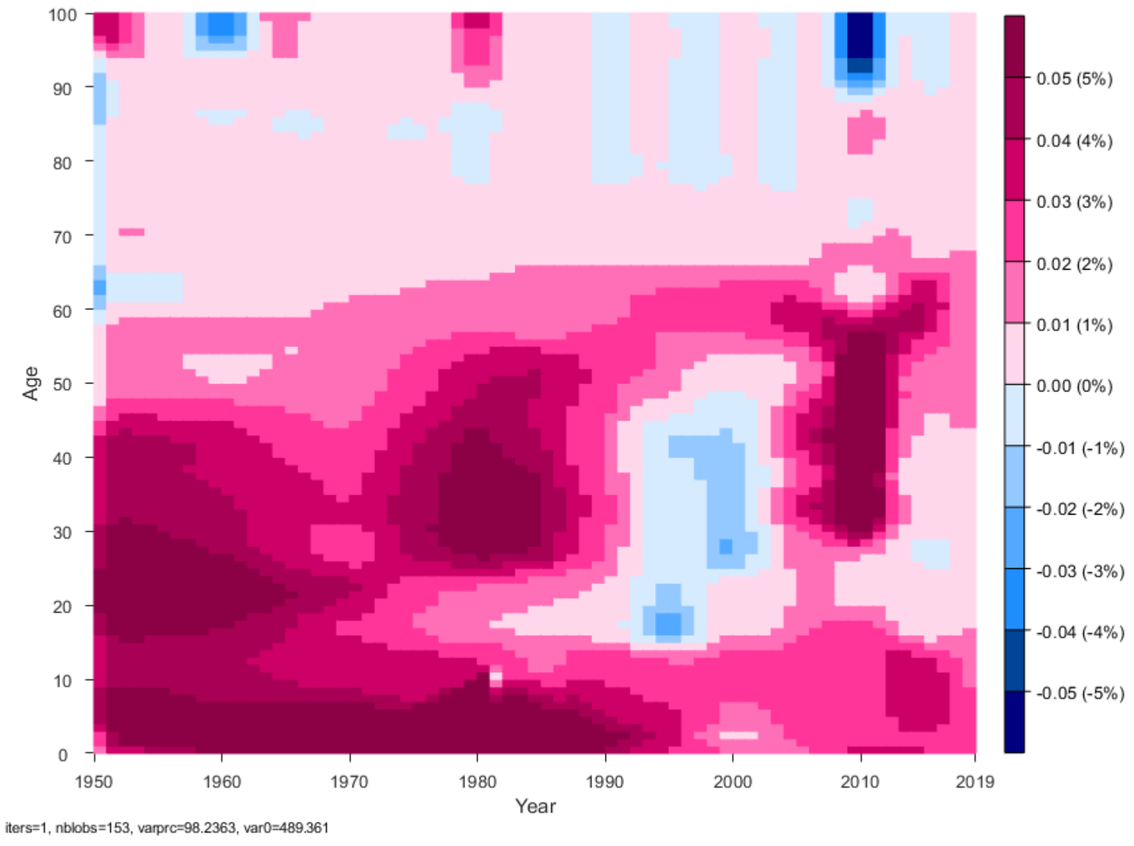
Females



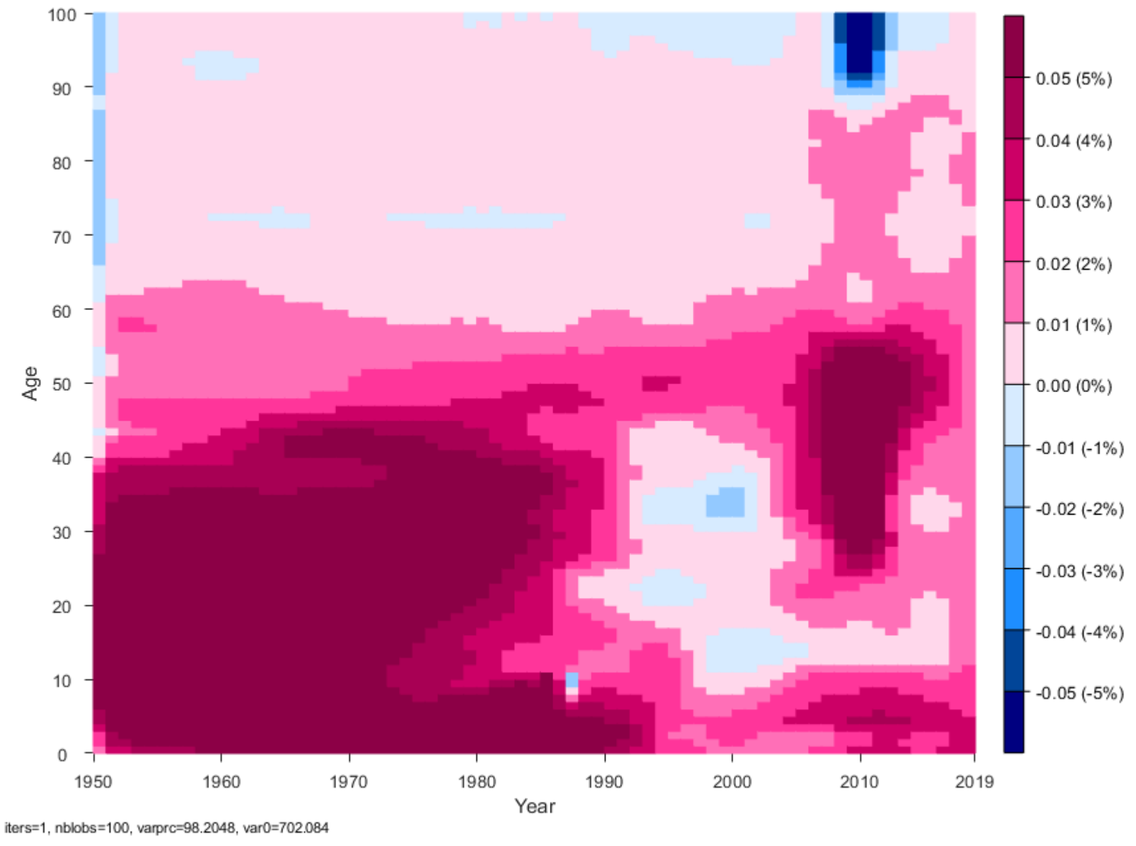
iters=1, nblobs=44, varprc=98.4578, var0=264.452

Kuwait

Males

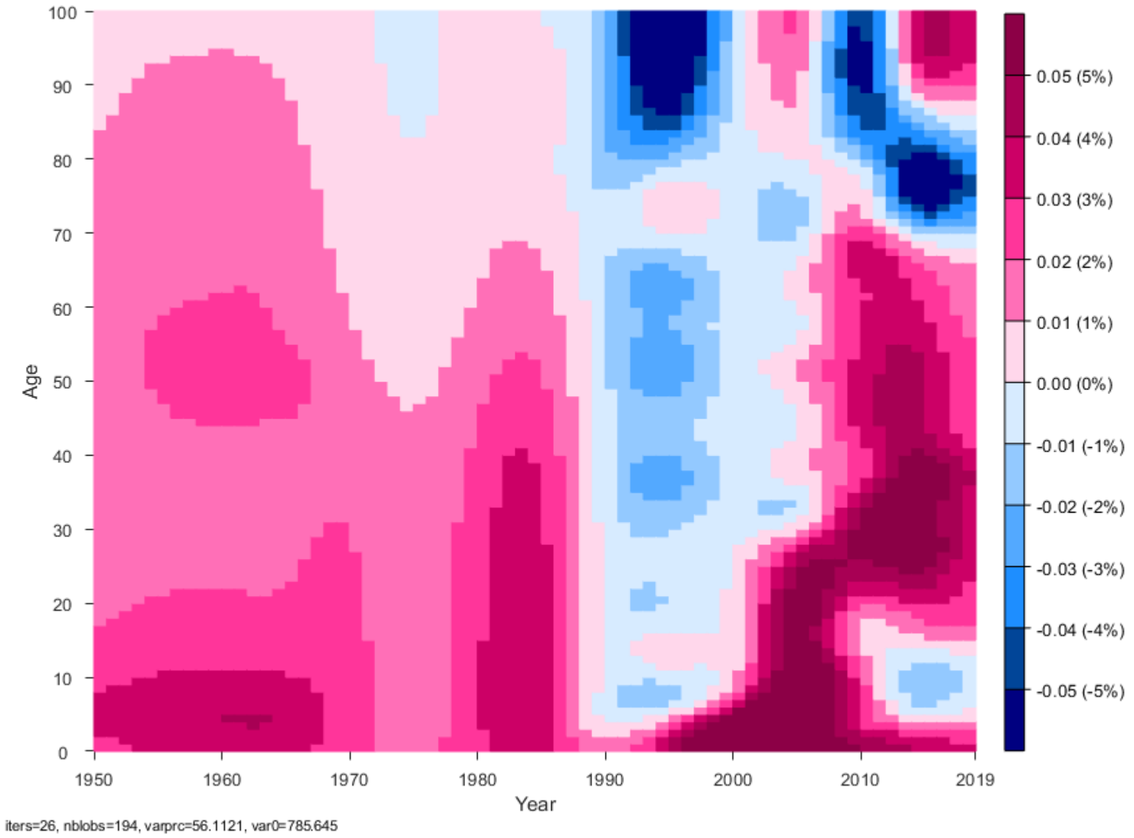


Females

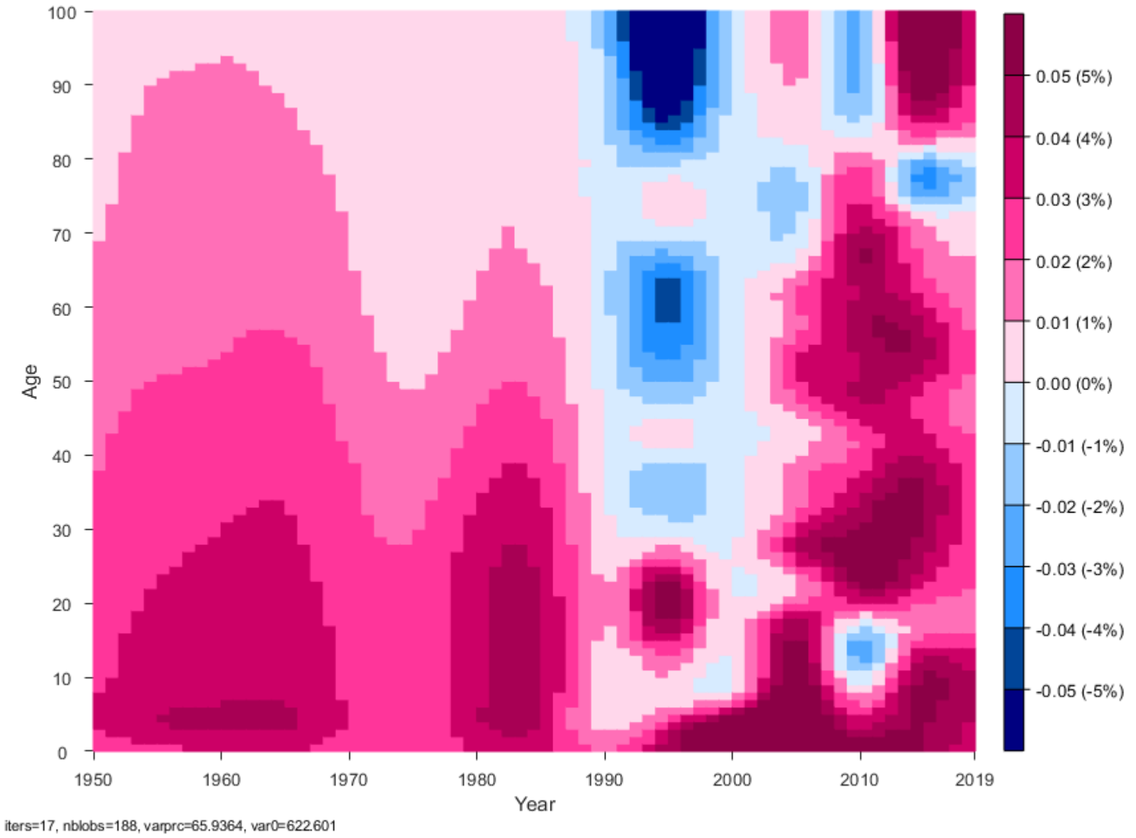


Kyrgyzstan

Males

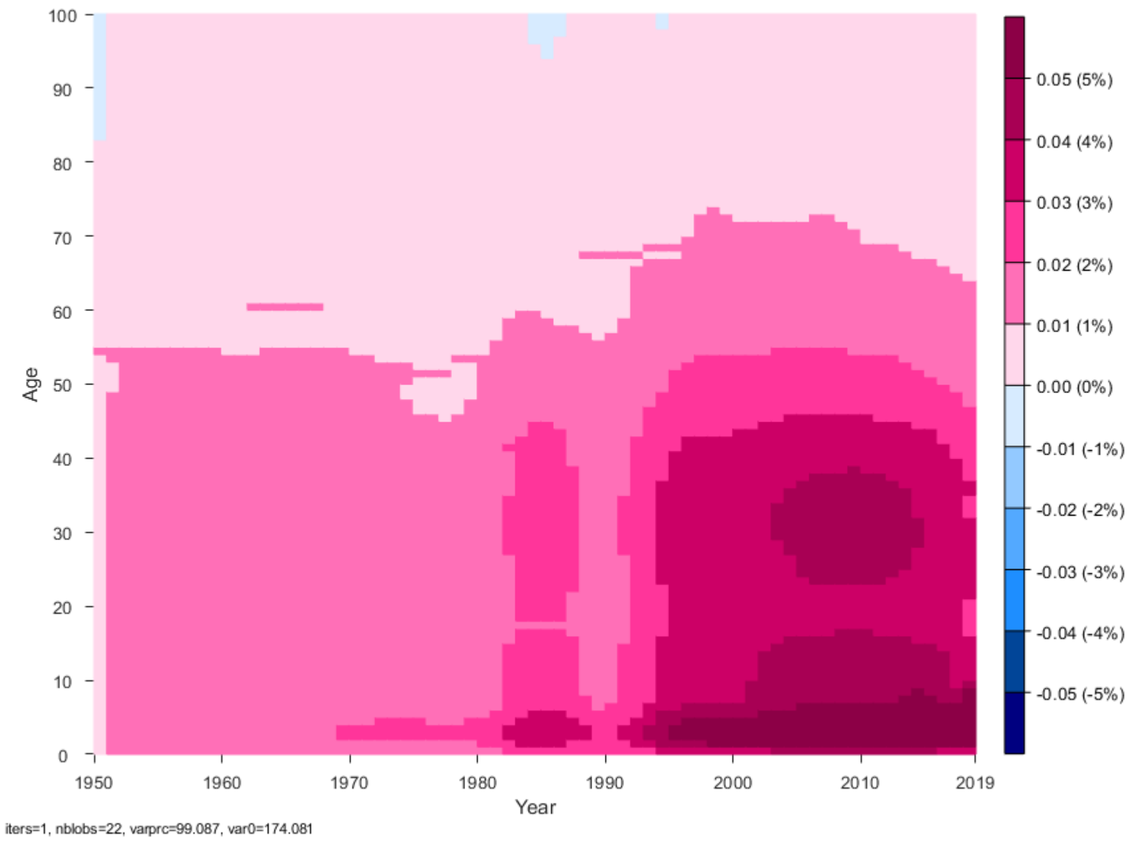


Females



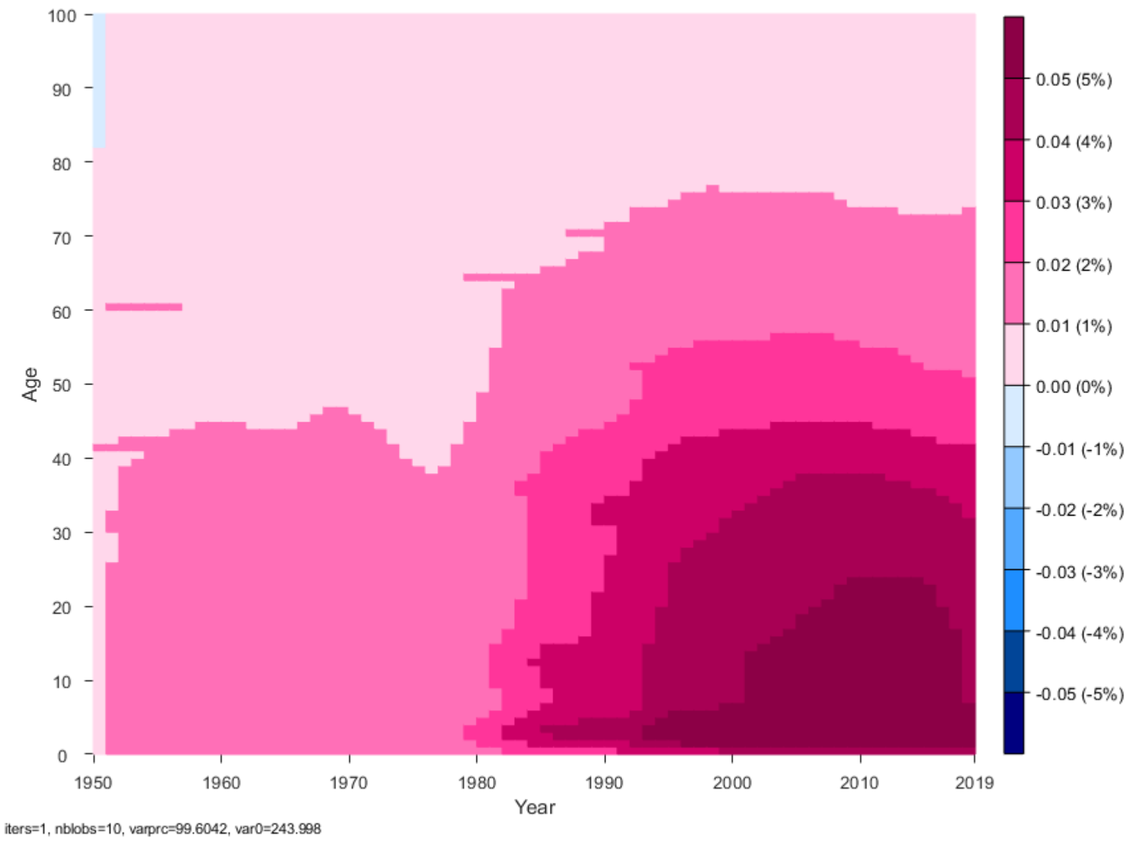
Lao People's Dem. Republic

Males



iters=1, nblobs=22, varprc=99.087, var0=174.081

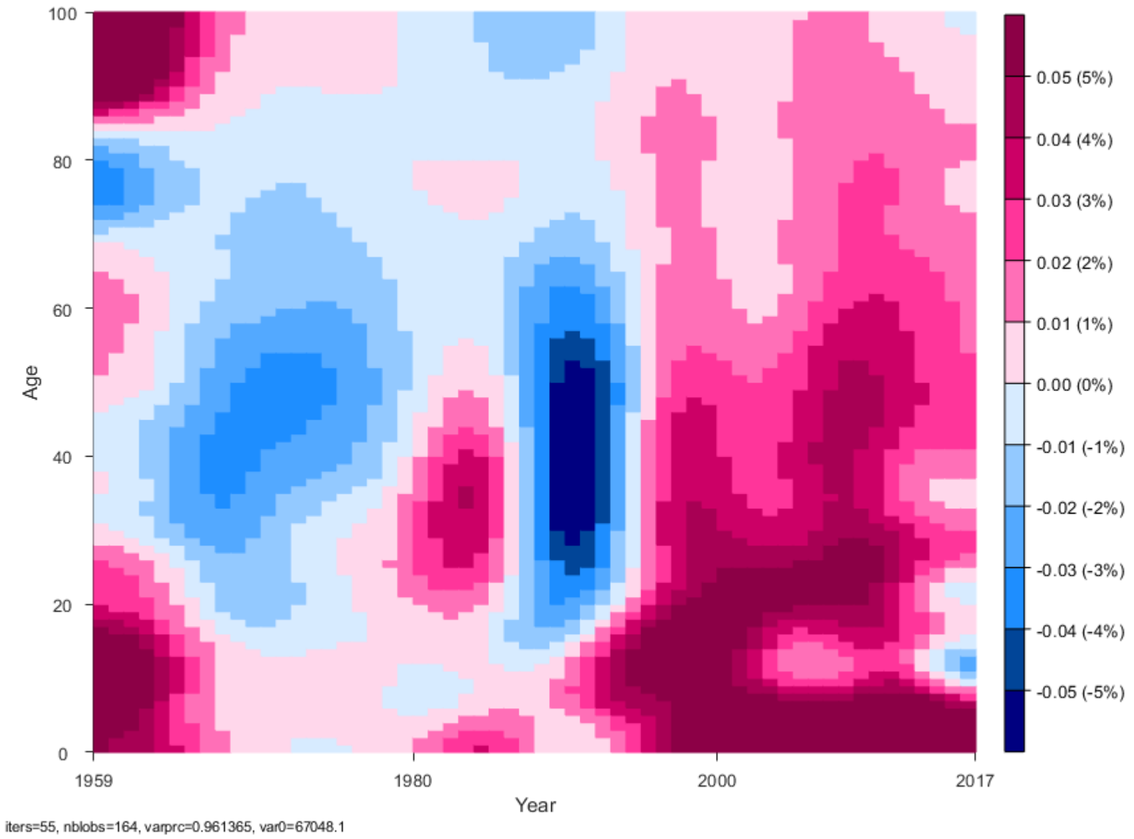
Females



iters=1, nblobs=10, varprc=99.6042, var0=243.998

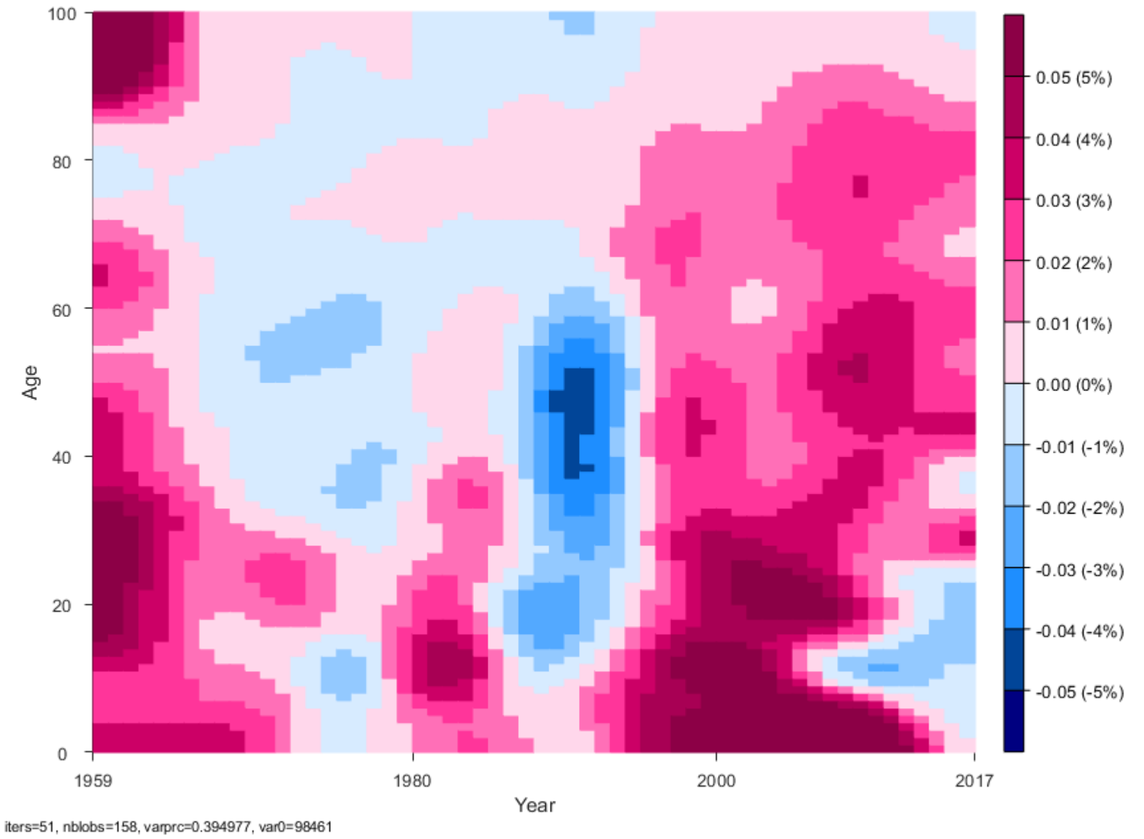
Latvia

Males



iters=55, nblobs=164, varprc=0.961365, var0=67048.1

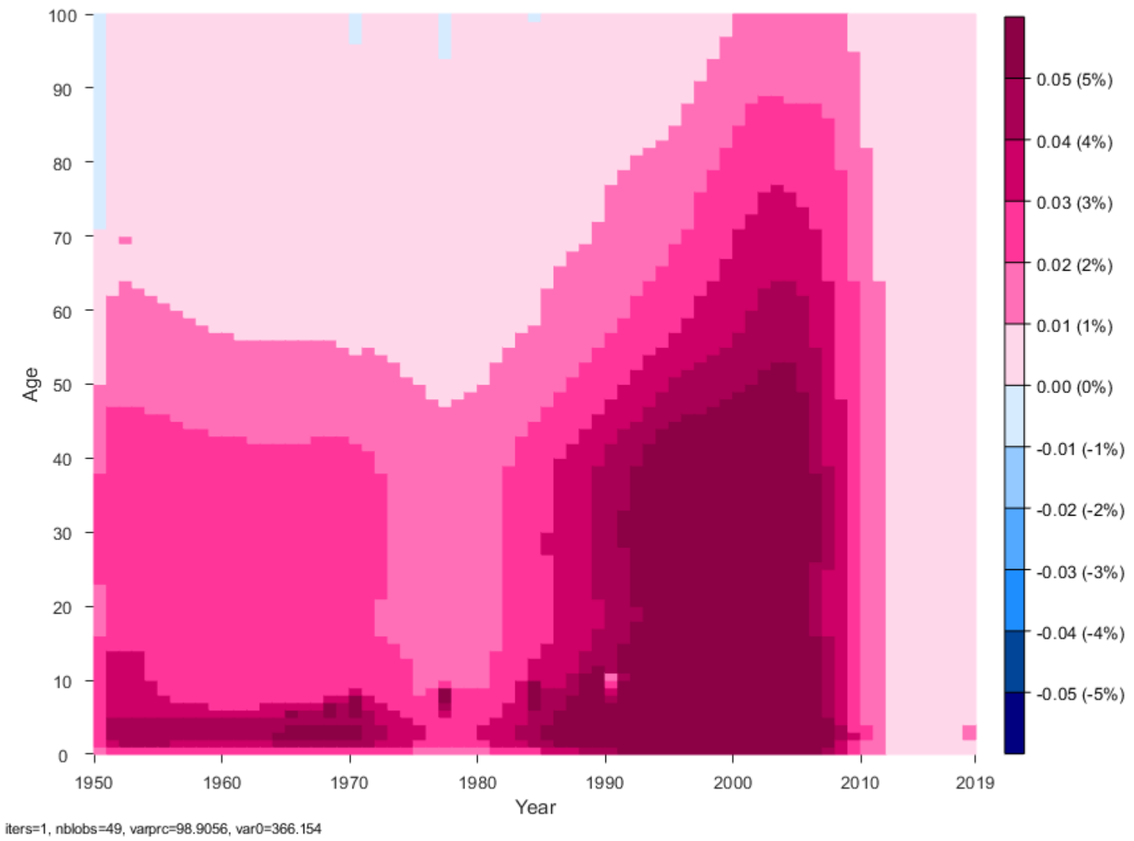
Females



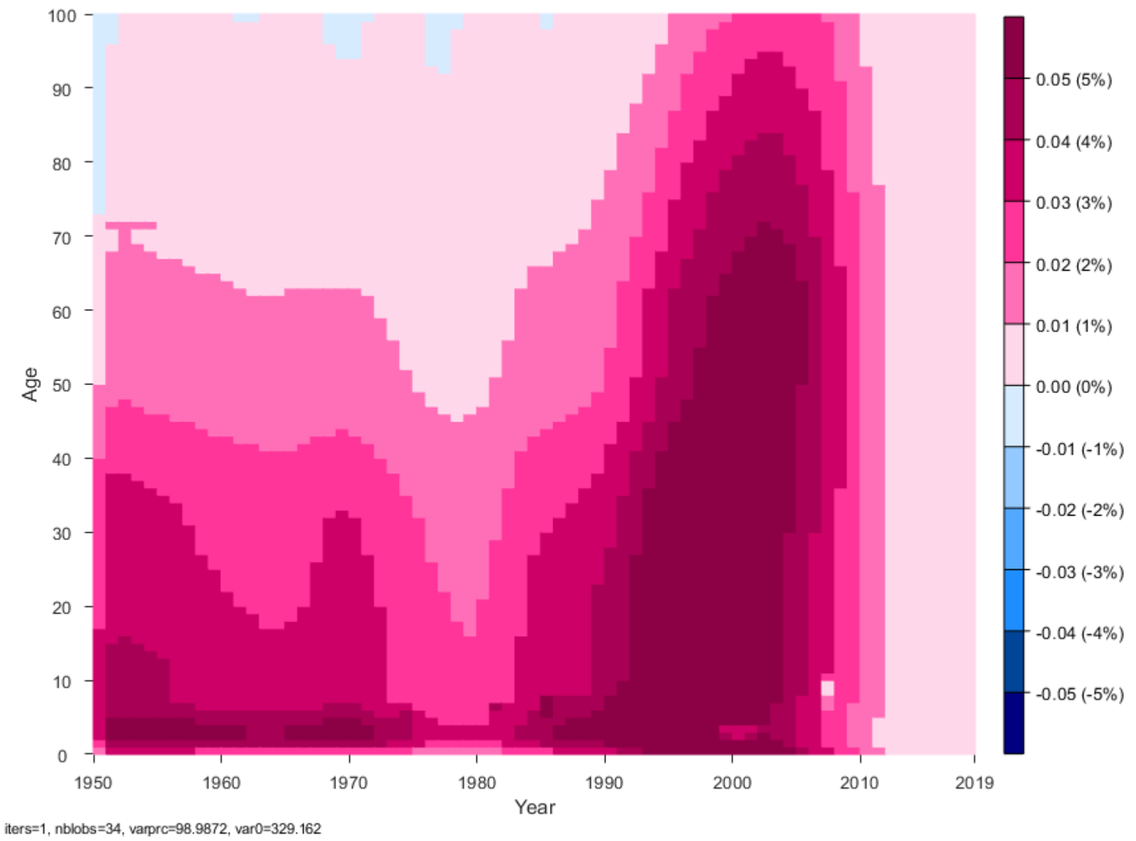
iters=51, nblobs=158, varprc=0.394977, var0=98461

Lebanon

Males

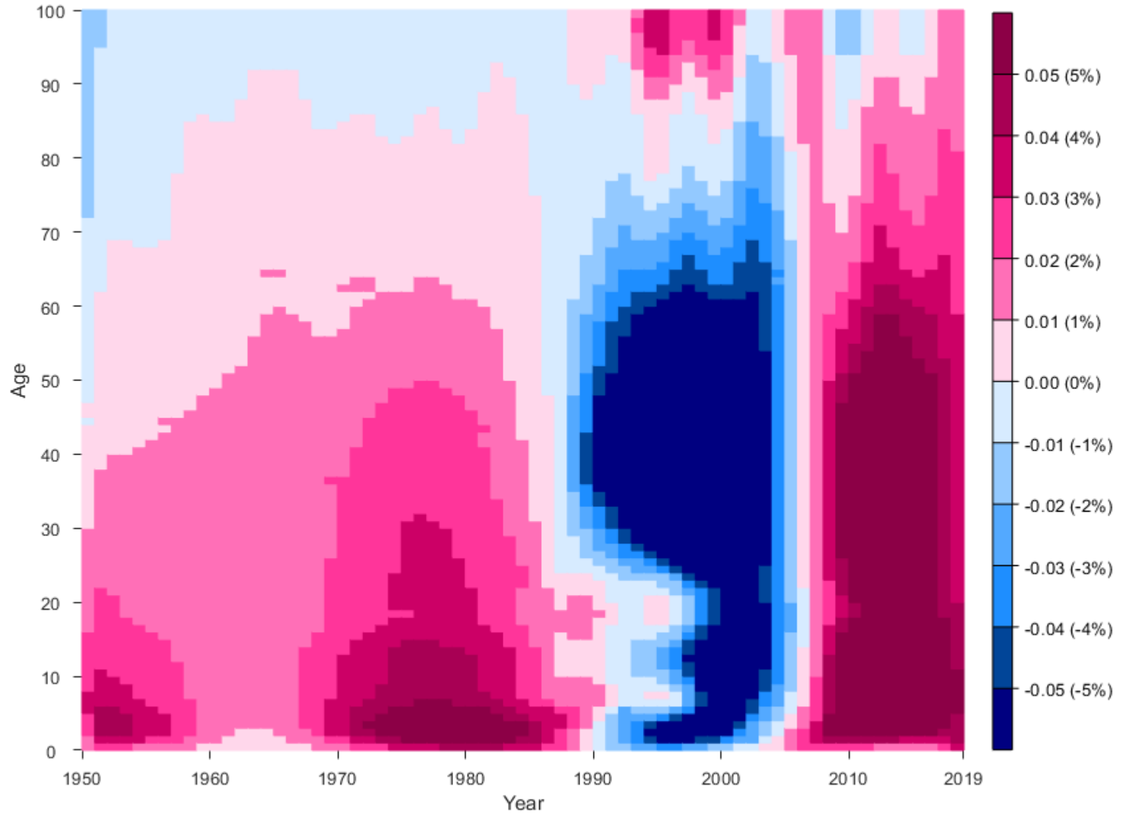


Females



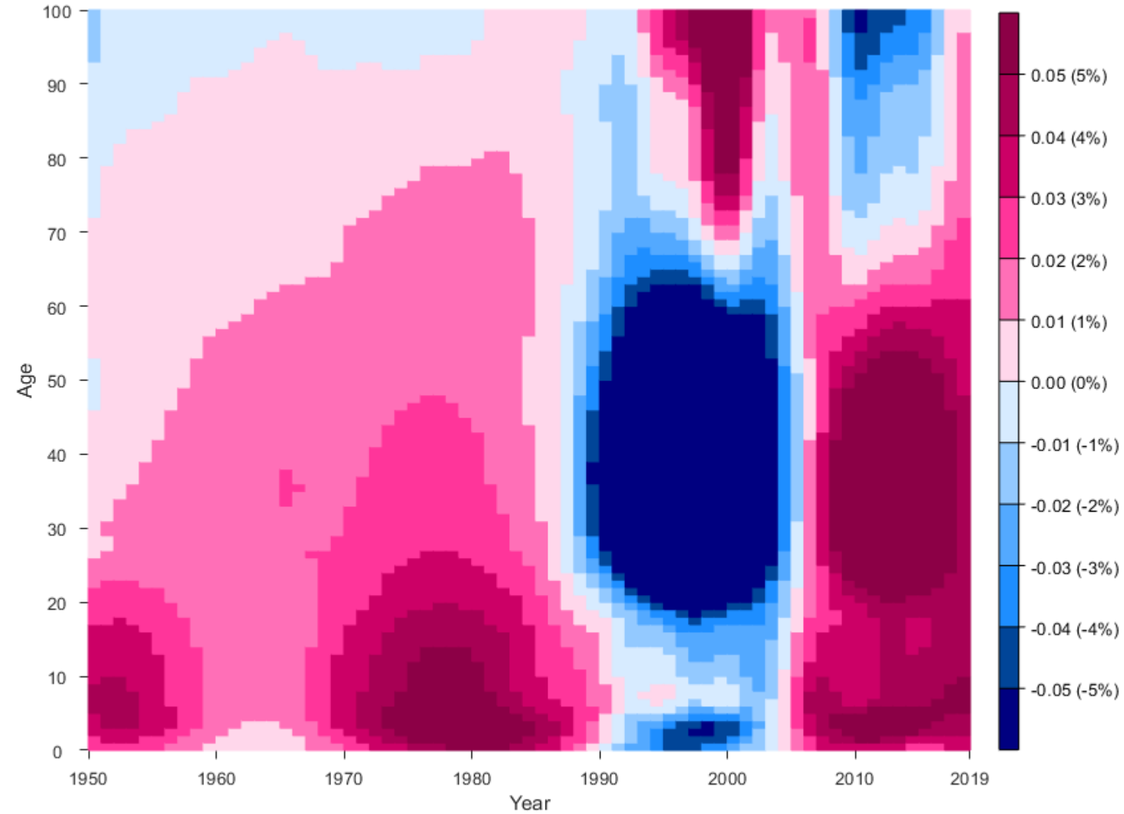
Lesotho

Males



iters=1, nblobs=180, varprc=99.0575, var0=1159.8

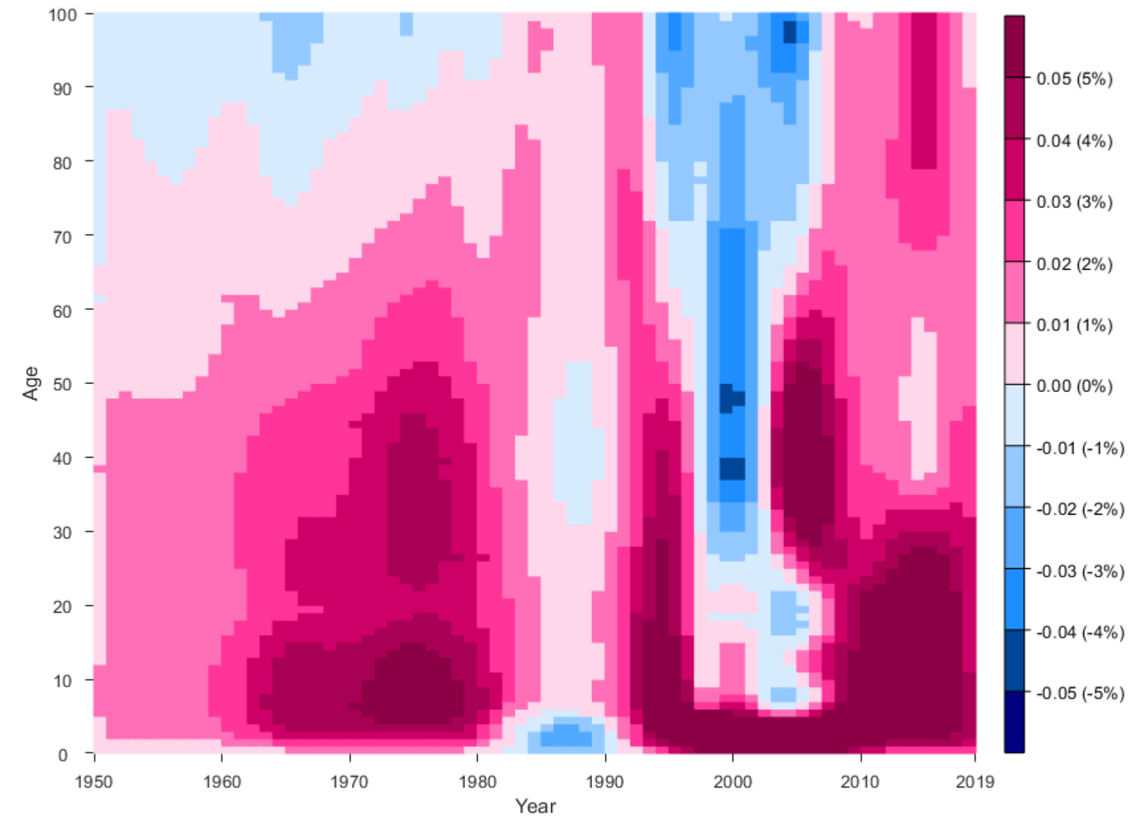
Females



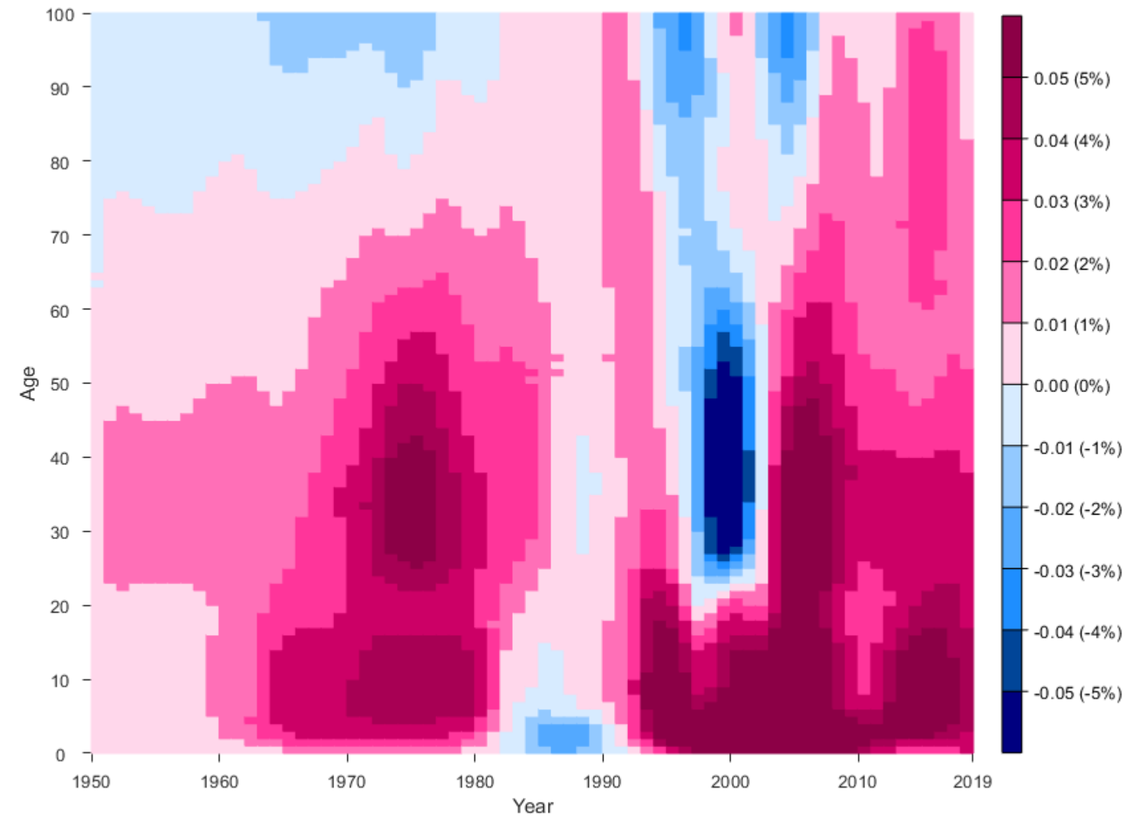
iters=6, nblobs=193, varprc=93.8892, var0=2046.54

Liberia

Males

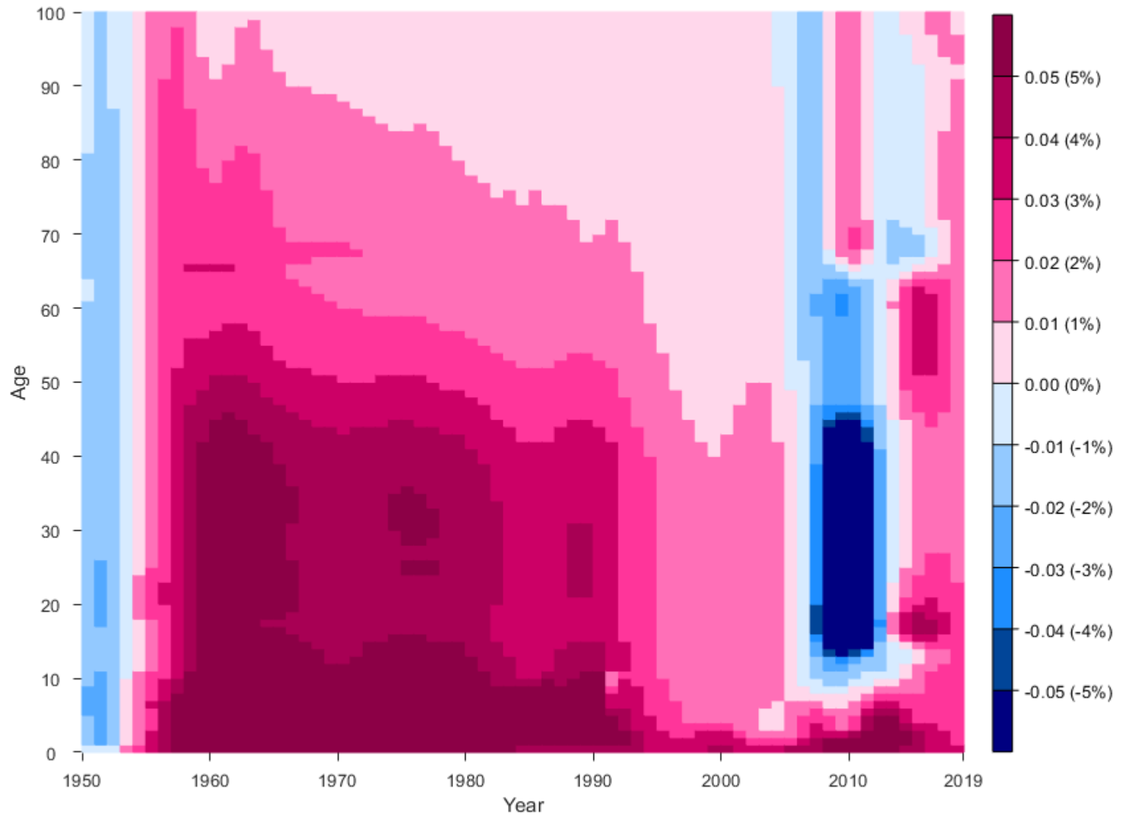


Females



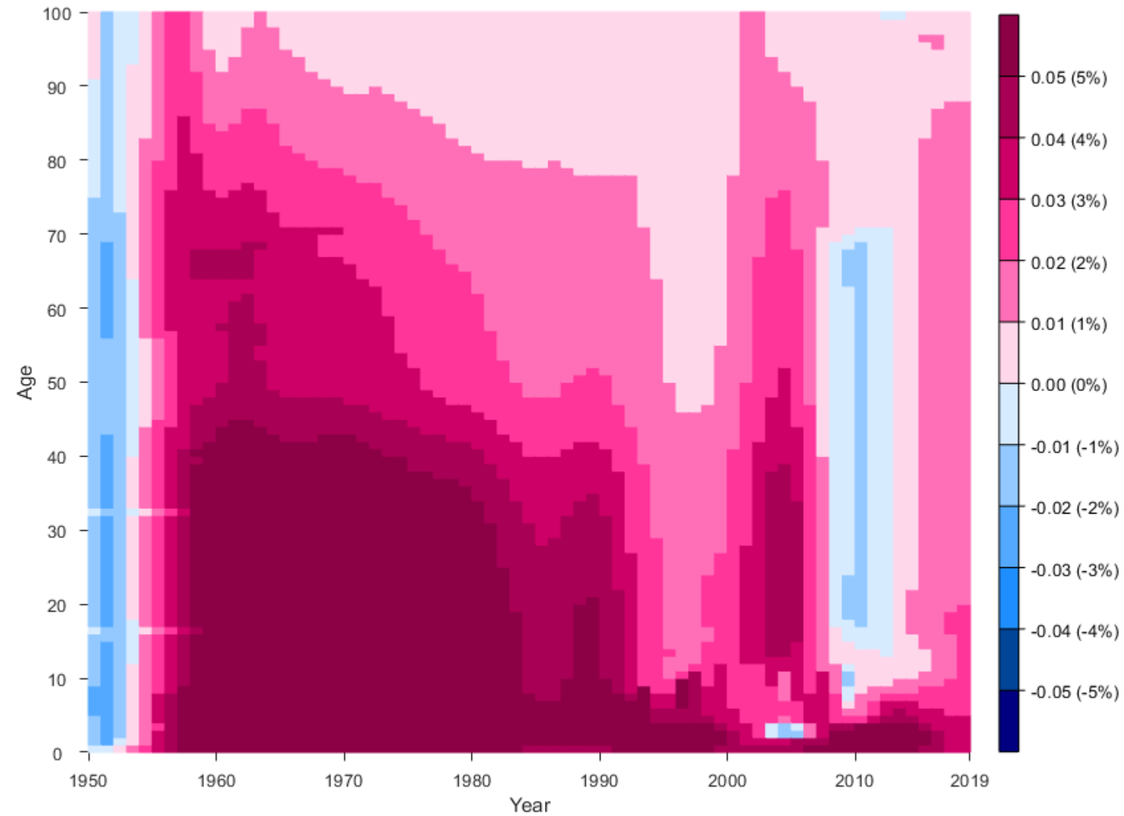
Libya

Males



iters=1, nblobs=128, varprc=97.7131, var0=783.721

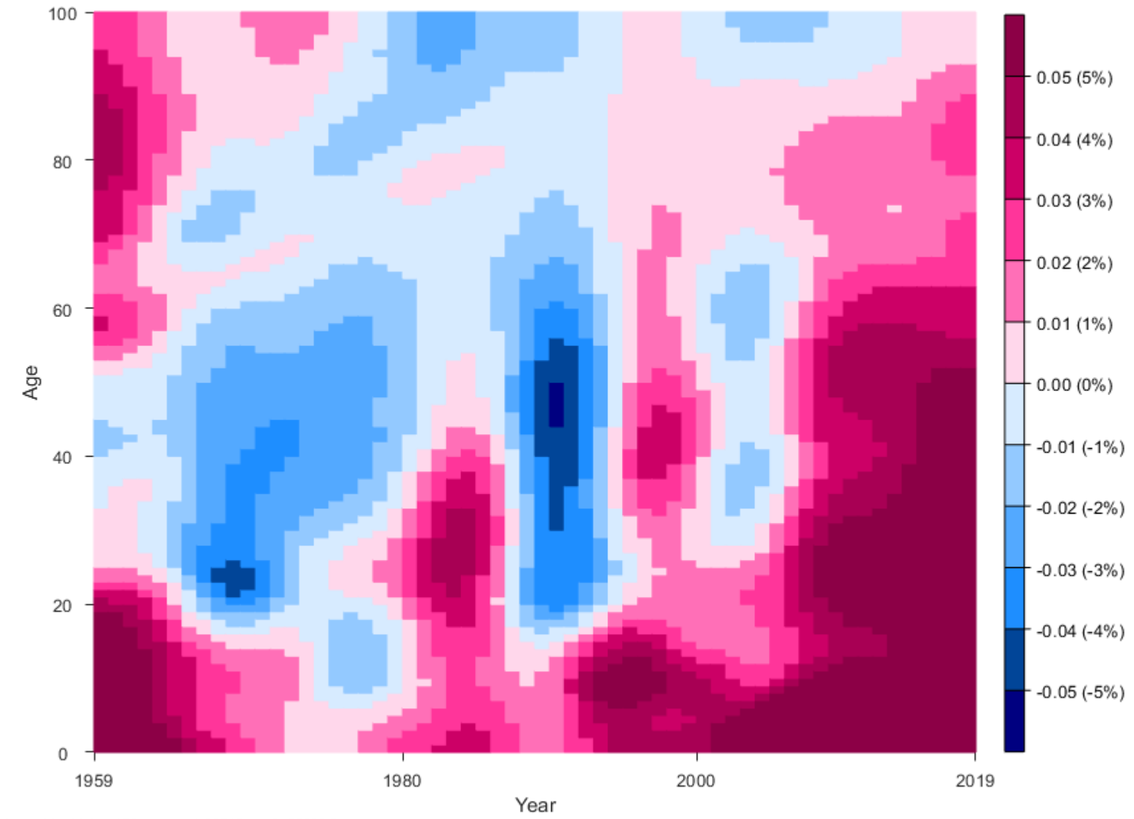
Females



iters=1, nblobs=97, varprc=98.6894, var0=576.414

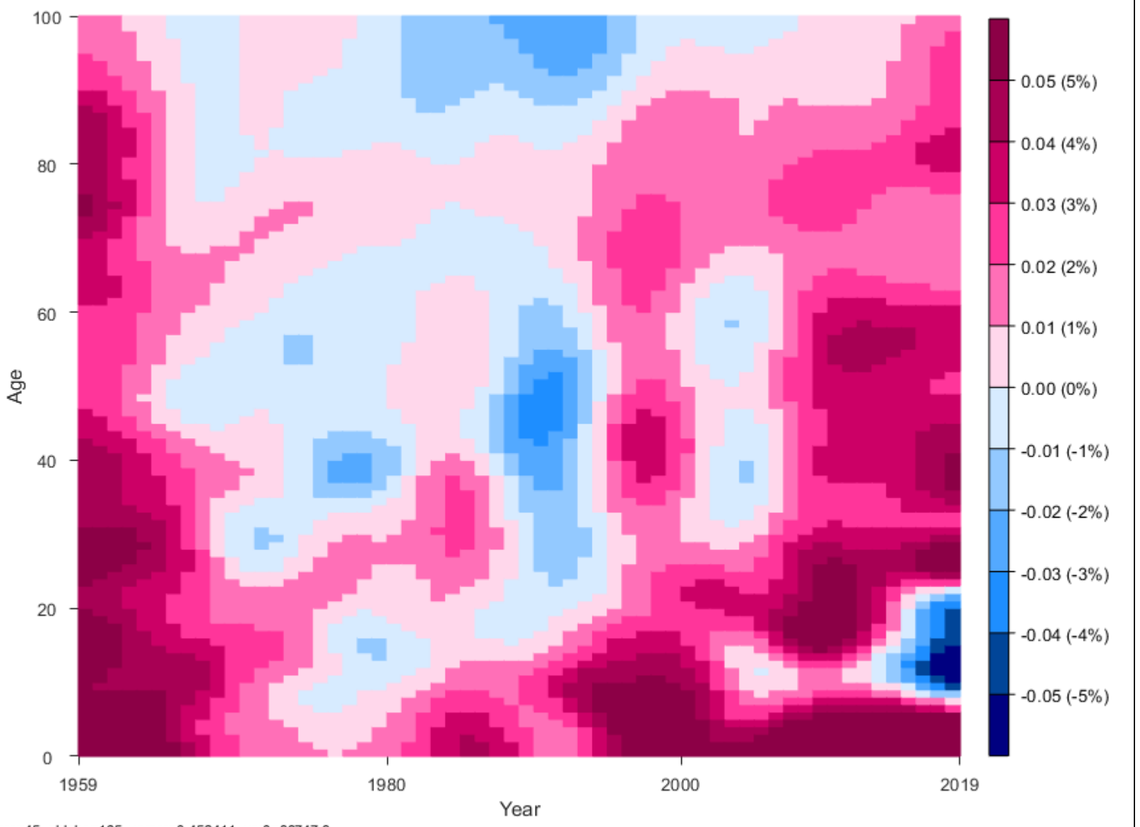
Lithuania

Males



iters=44, nblobs=170, varprc=1.28713, var0=56060.3

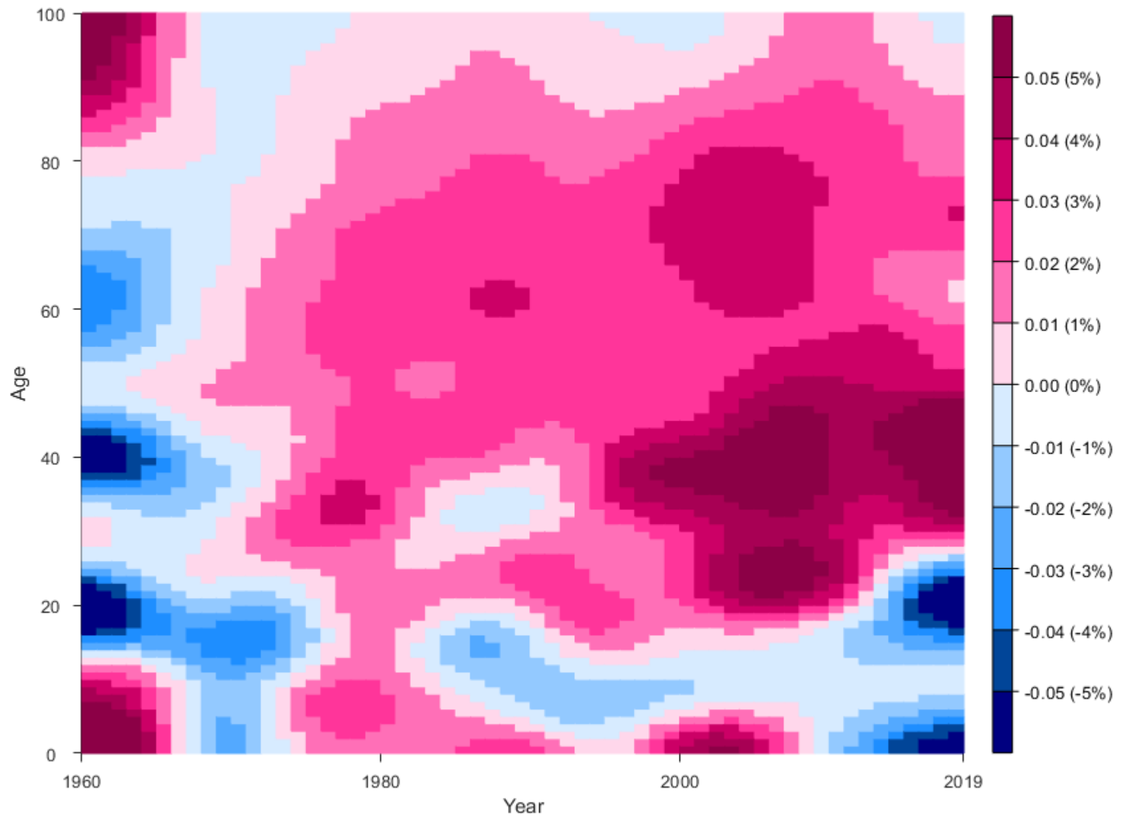
Females



iters=45, nblobs=165, varprc=0.452411, var0=88747.3

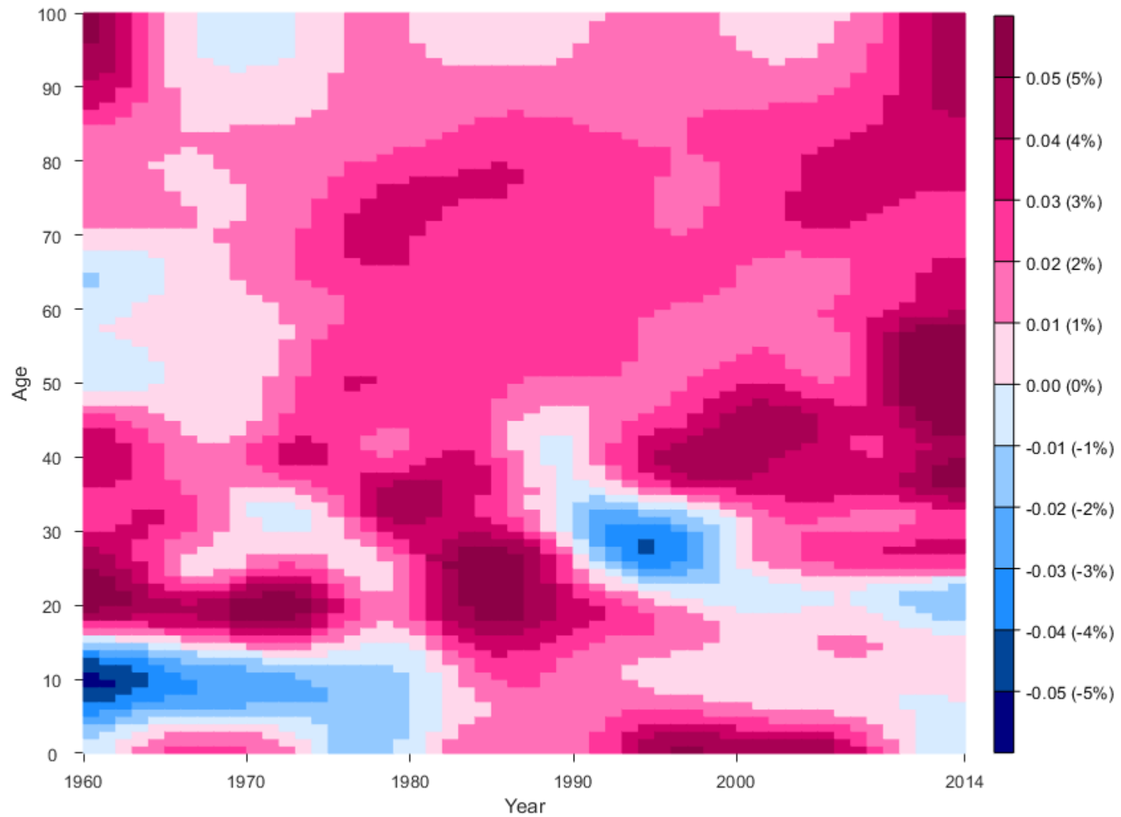
Luxembourg

Males



iters=67, nblobs=162, varprc=0.237889, var0=179780

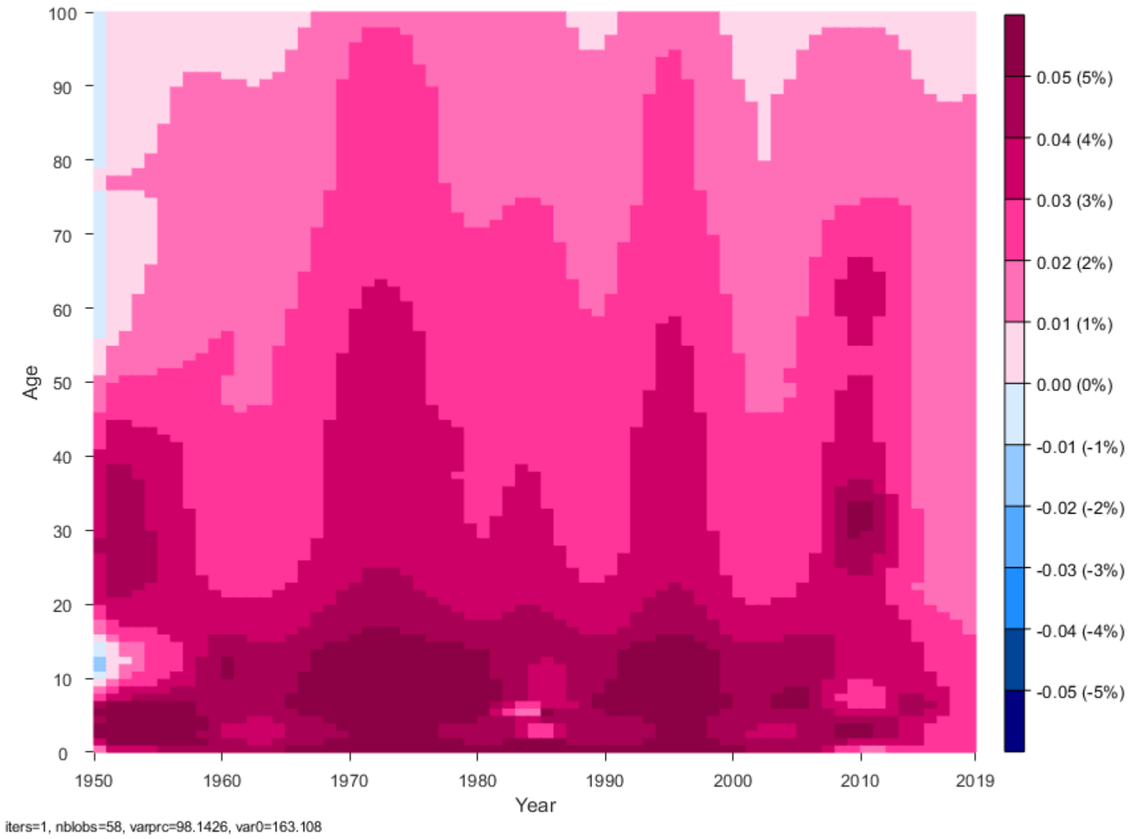
Females



iters=56, nblobs=152, varprc=0.147437, var0=186663

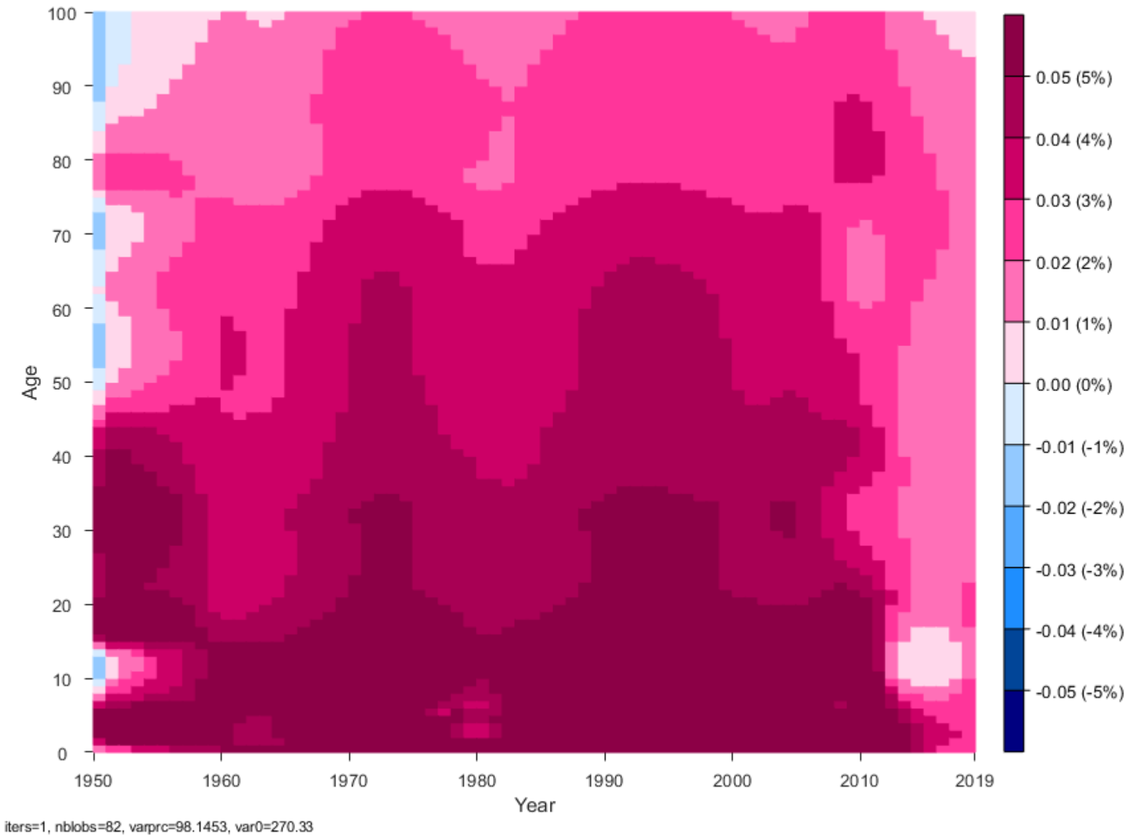
China, Macao SAR

Males



iters=1, nblobs=58, varprc=98.1426, var0=163.108

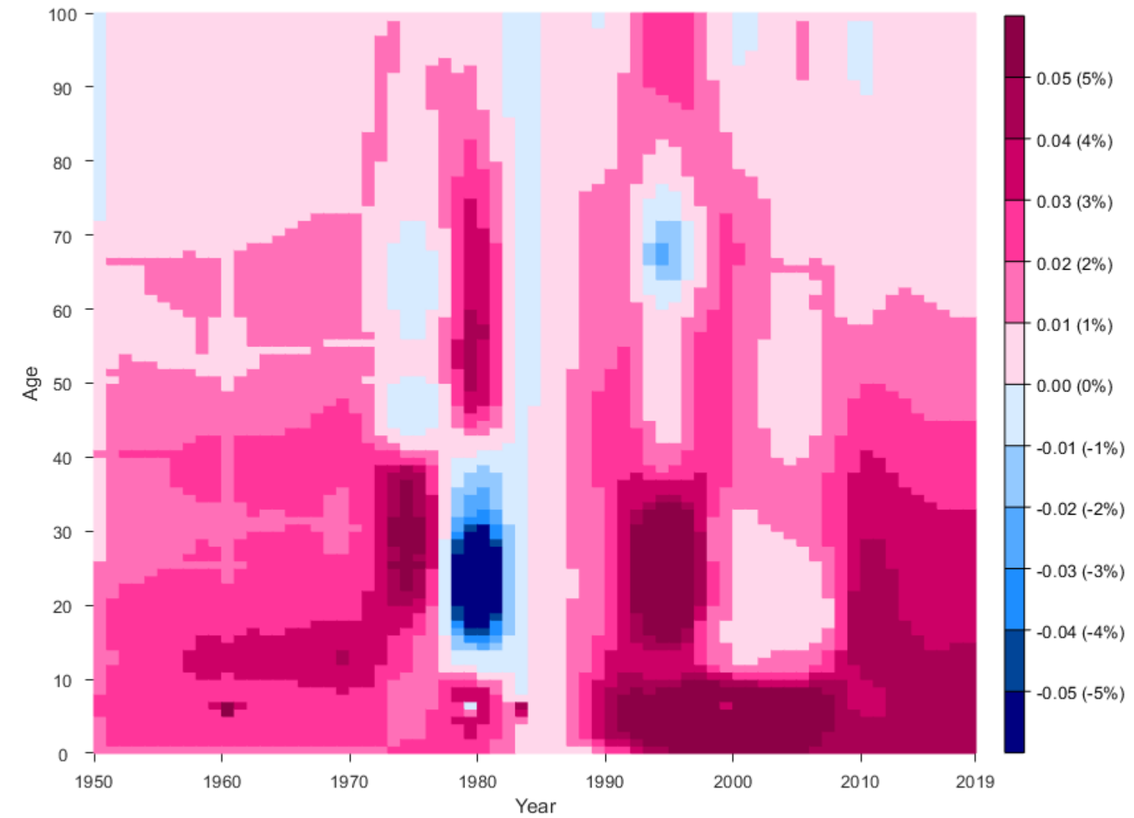
Females



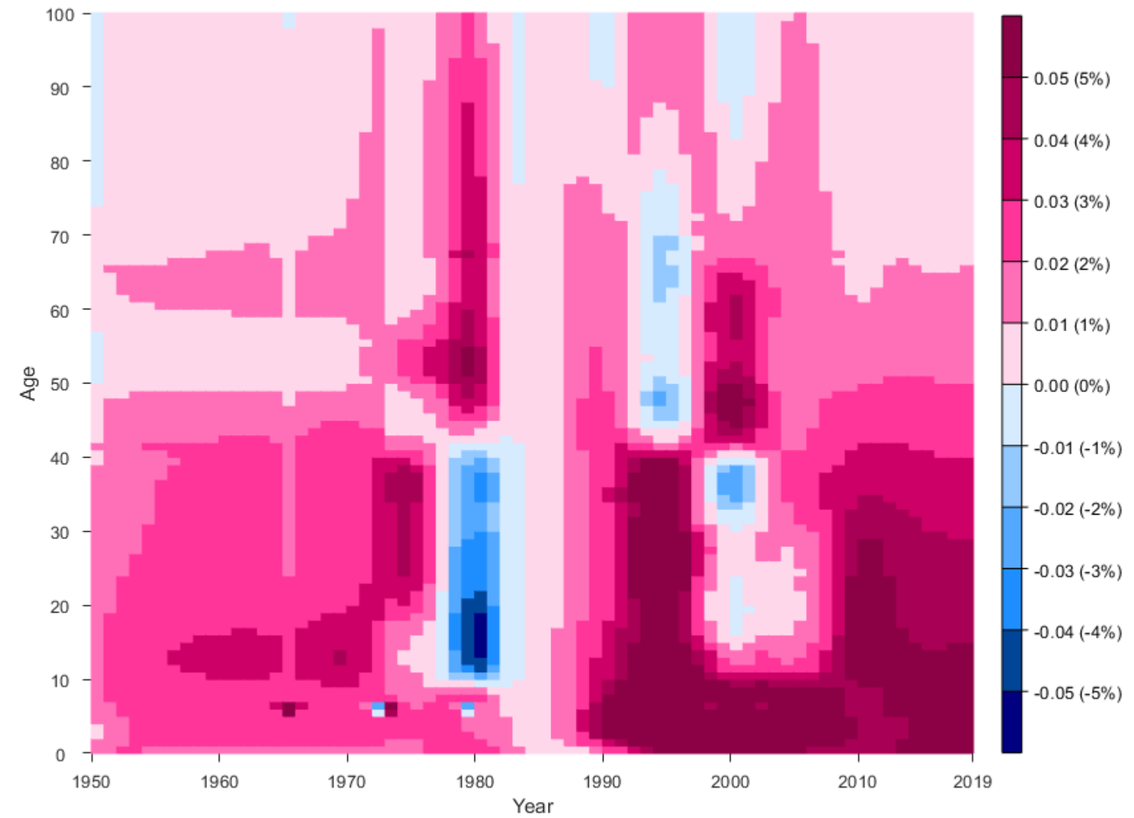
iters=1, nblobs=82, varprc=98.1453, var0=270.33

Madagascar

Males

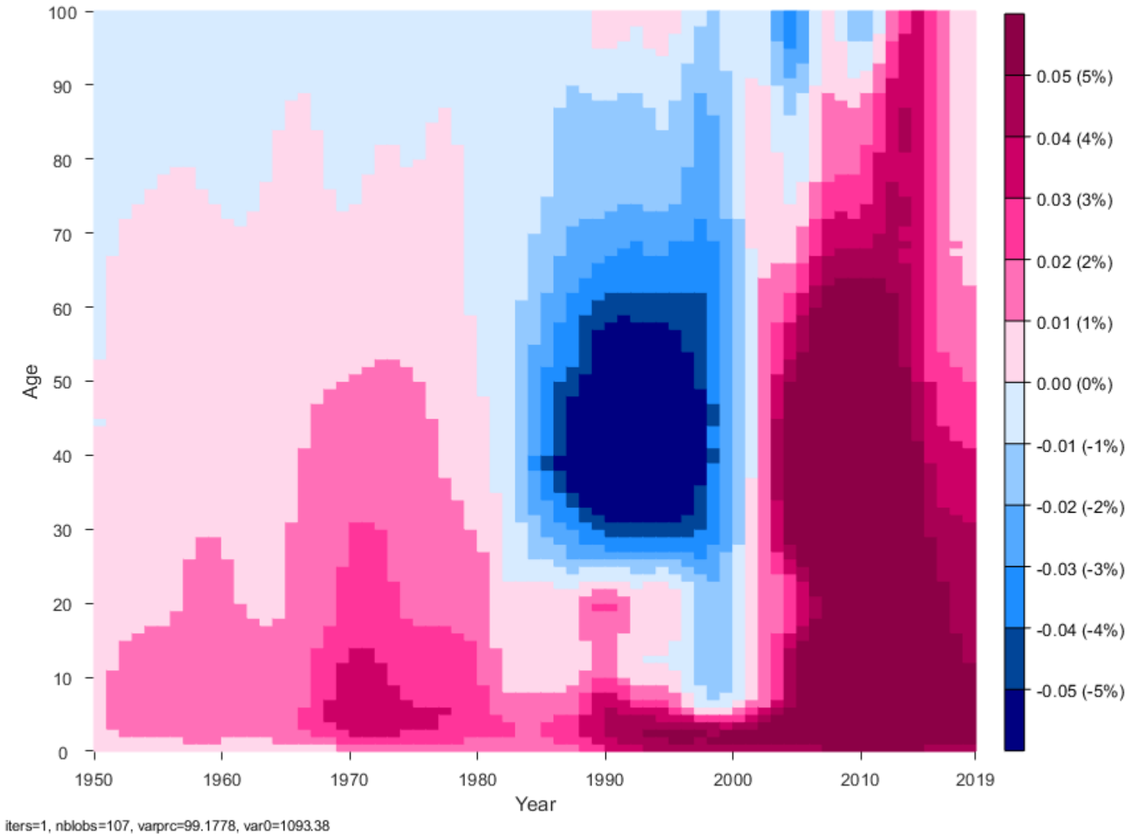


Females

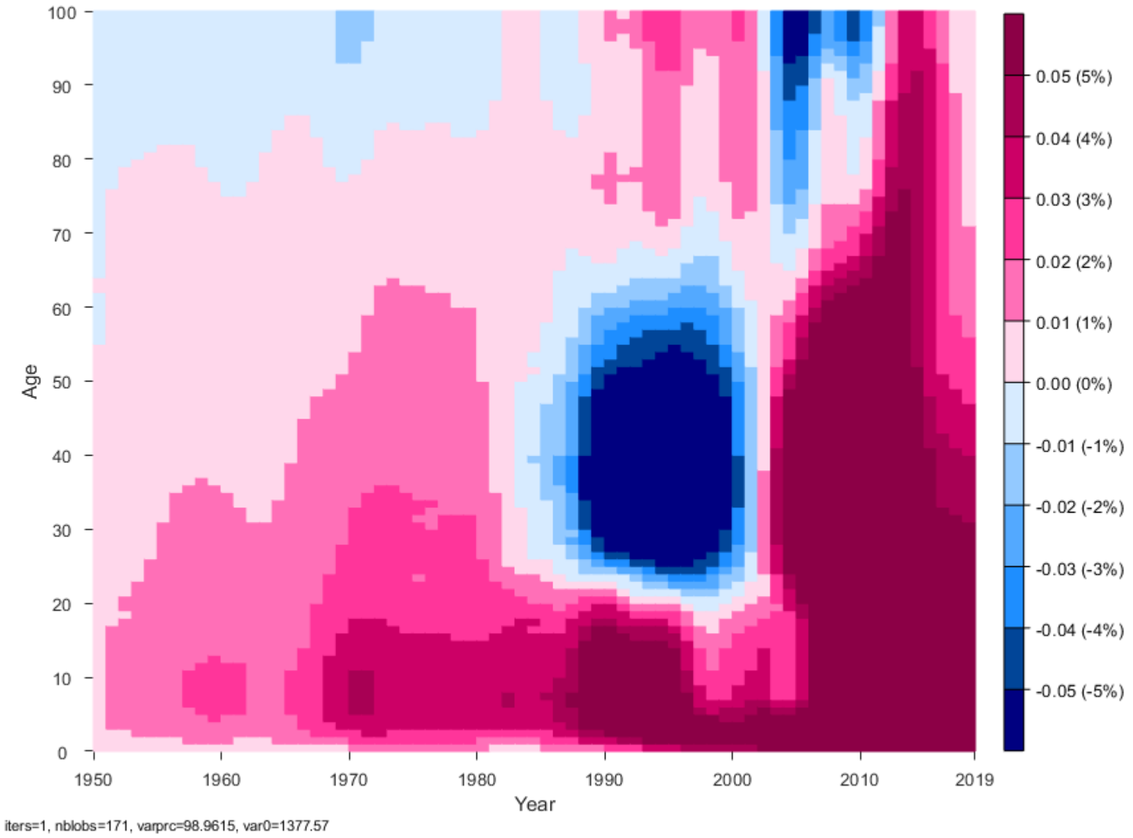


Malawi

Males

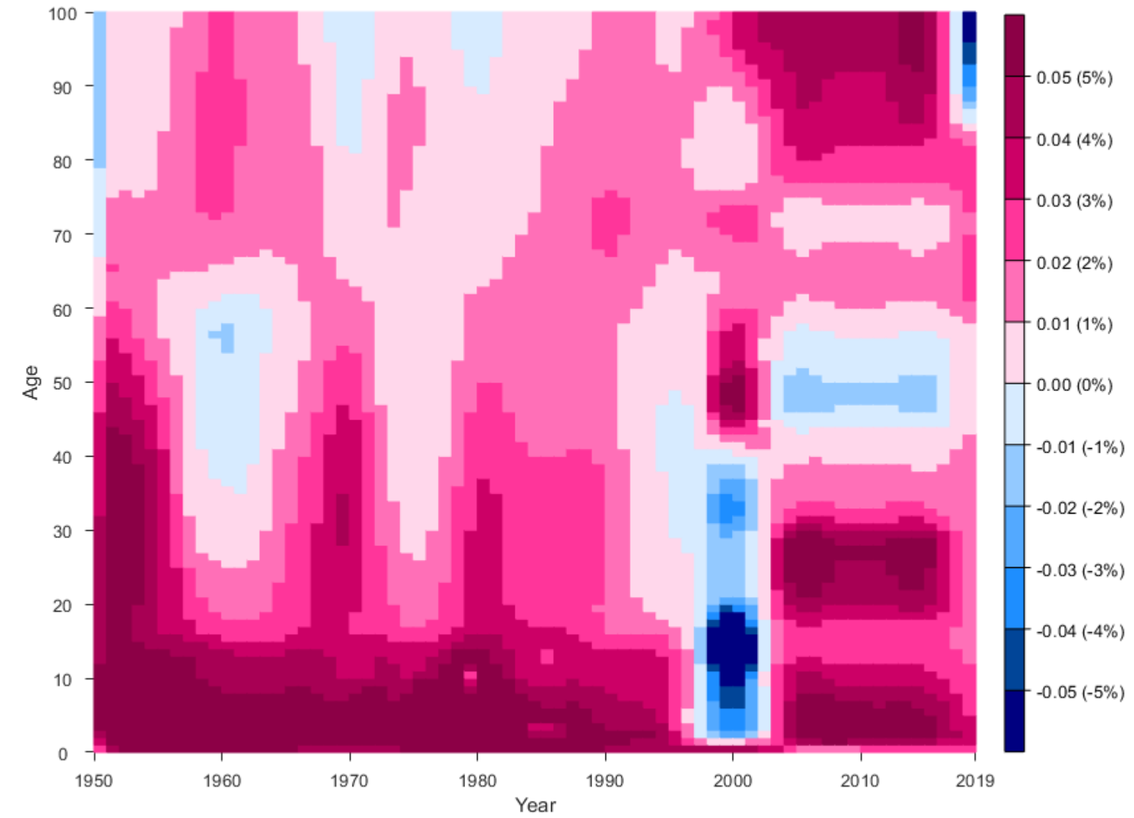


Females



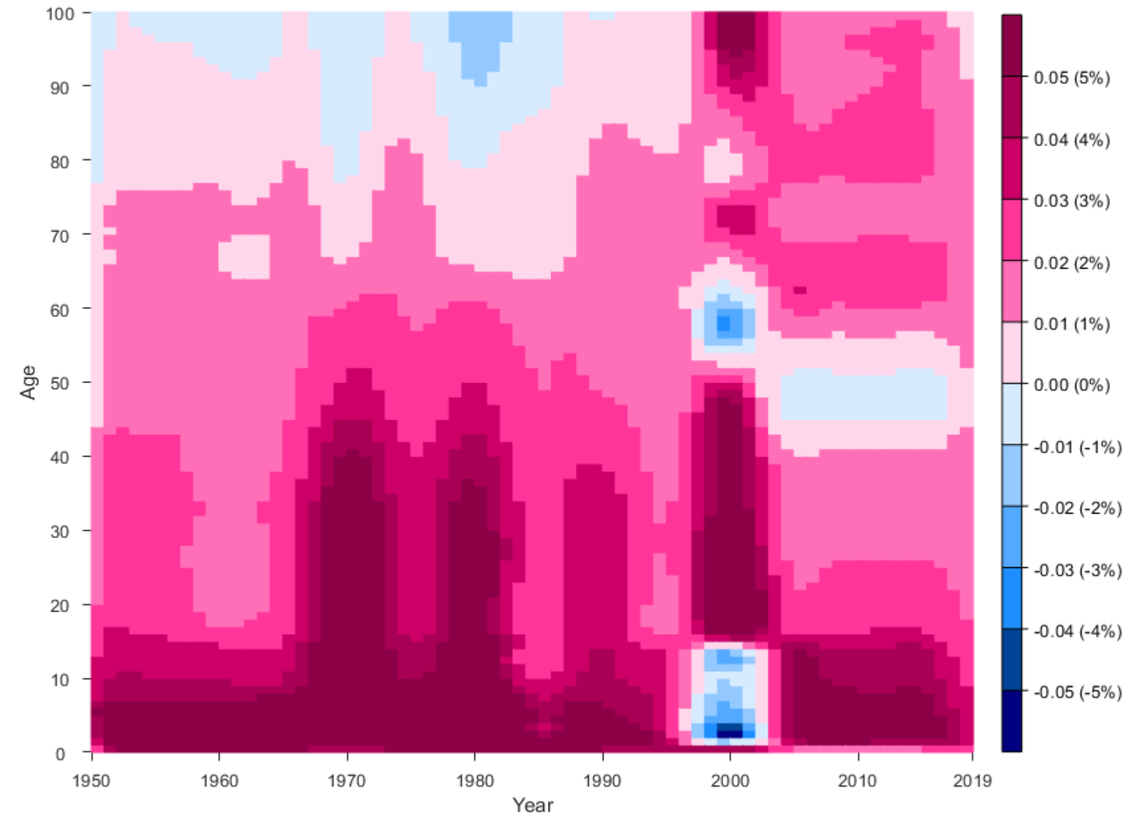
Malaysia

Males



iters=1, nblobs=150, varprc=96.9953, var0=424.072

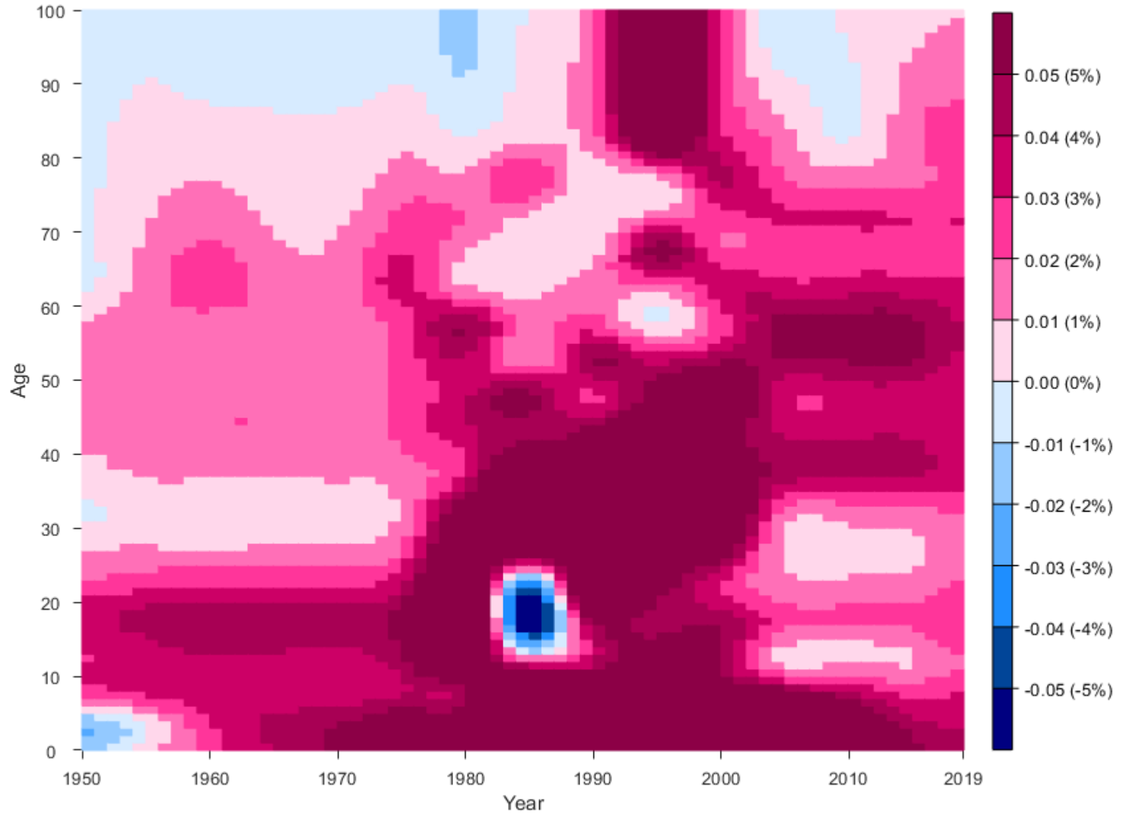
Females



iters=1, nblobs=118, varprc=97.6209, var0=422.175

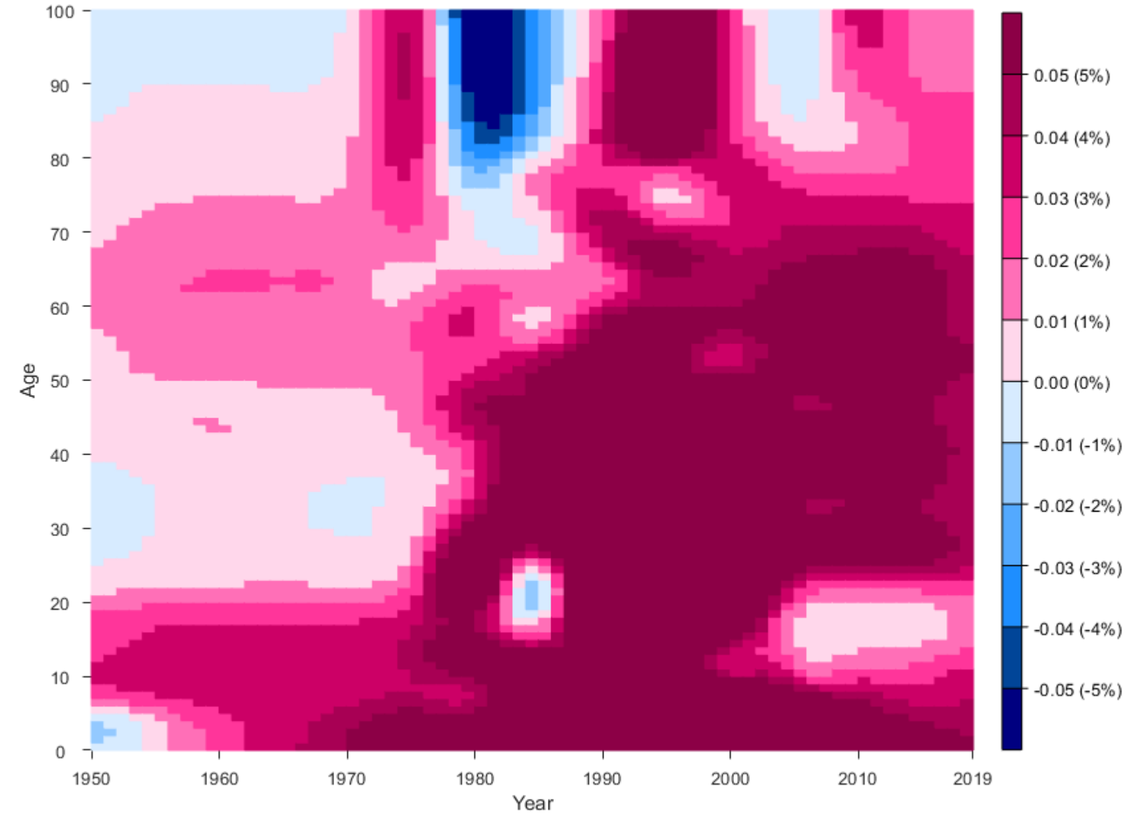
Maldives

Males



iters=18, nblobs=185, varprc=66.6445, var0=1206.79

Females



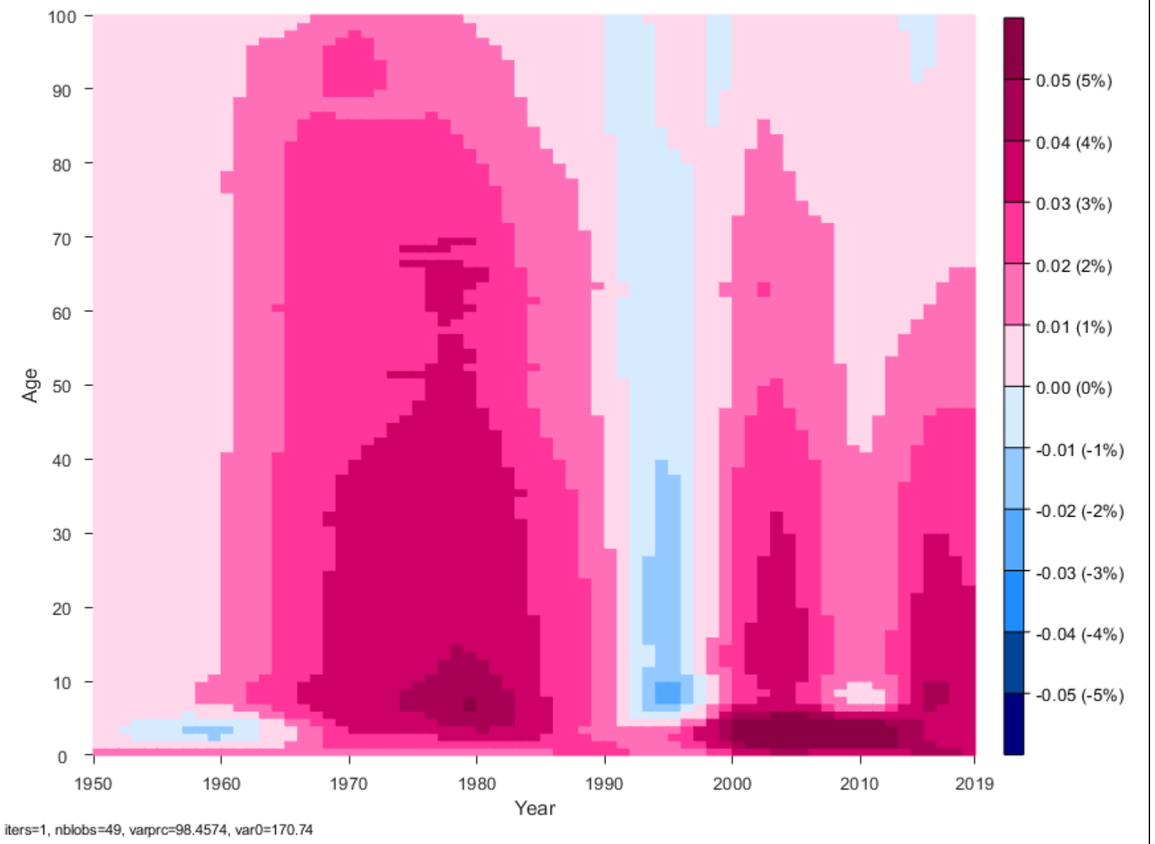
iters=22, nblobs=193, varprc=68.0192, var0=2107.83

Mali

Males

iters=1, nblobs=75, varprc=98.0514, var0=207.672

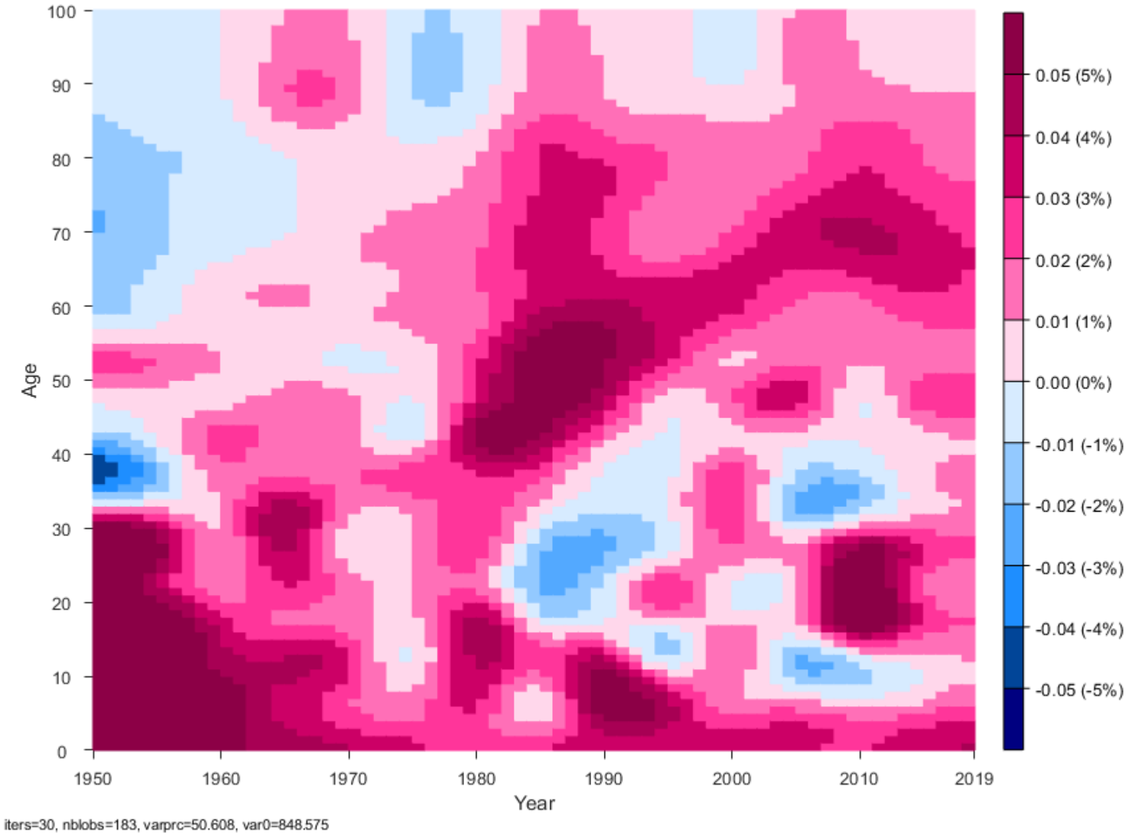
Females



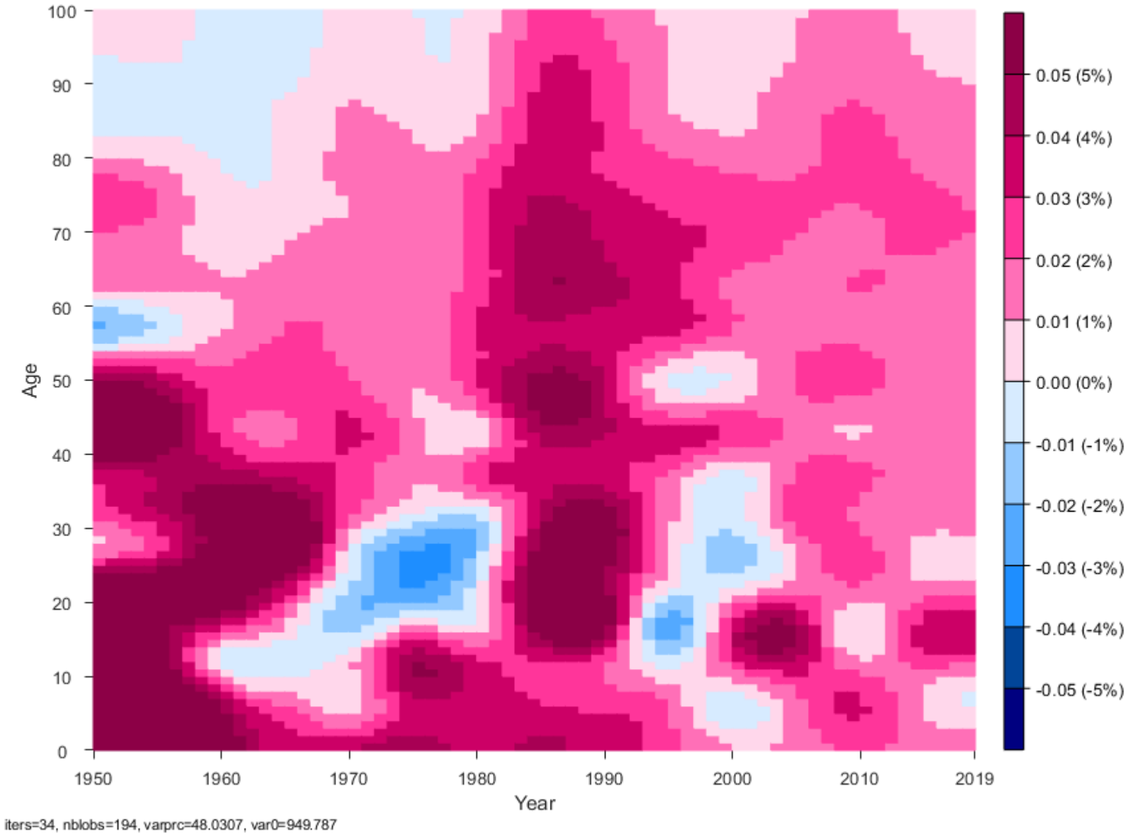
iters=1, nblobs=49, varprc=98.4574, var0=170.74

Malta

Males

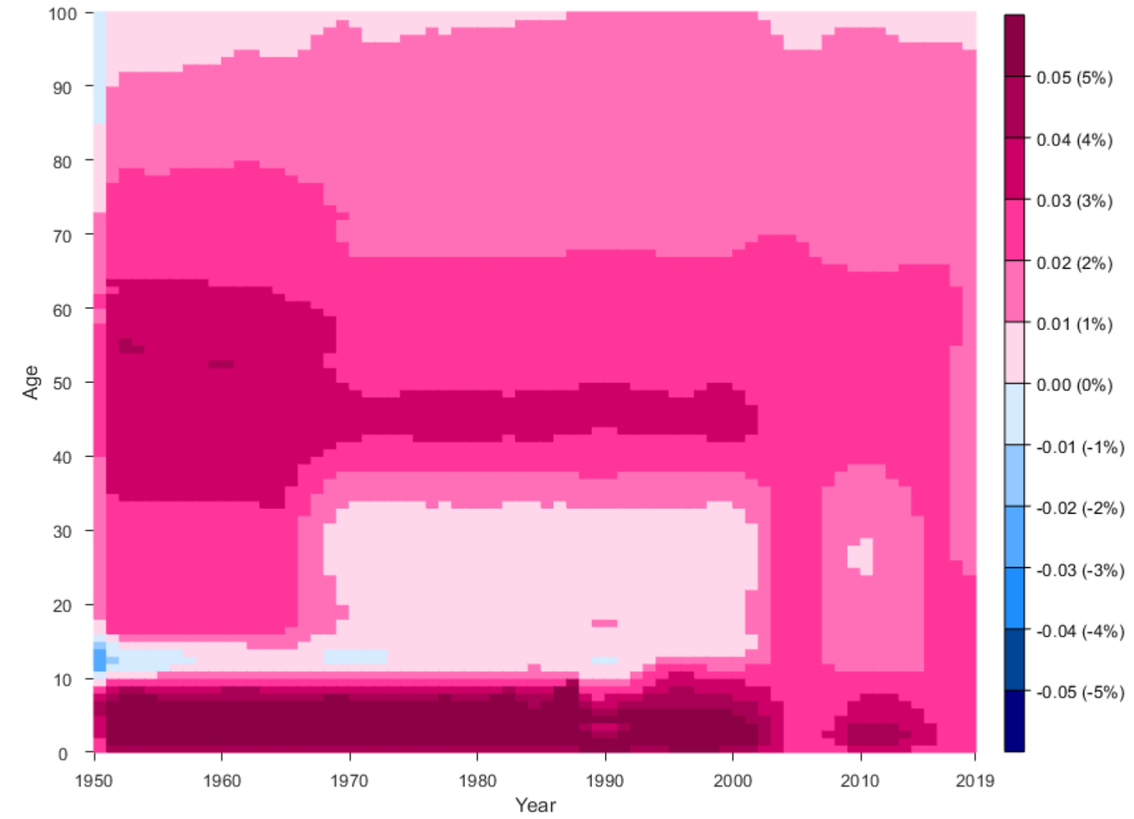


Females



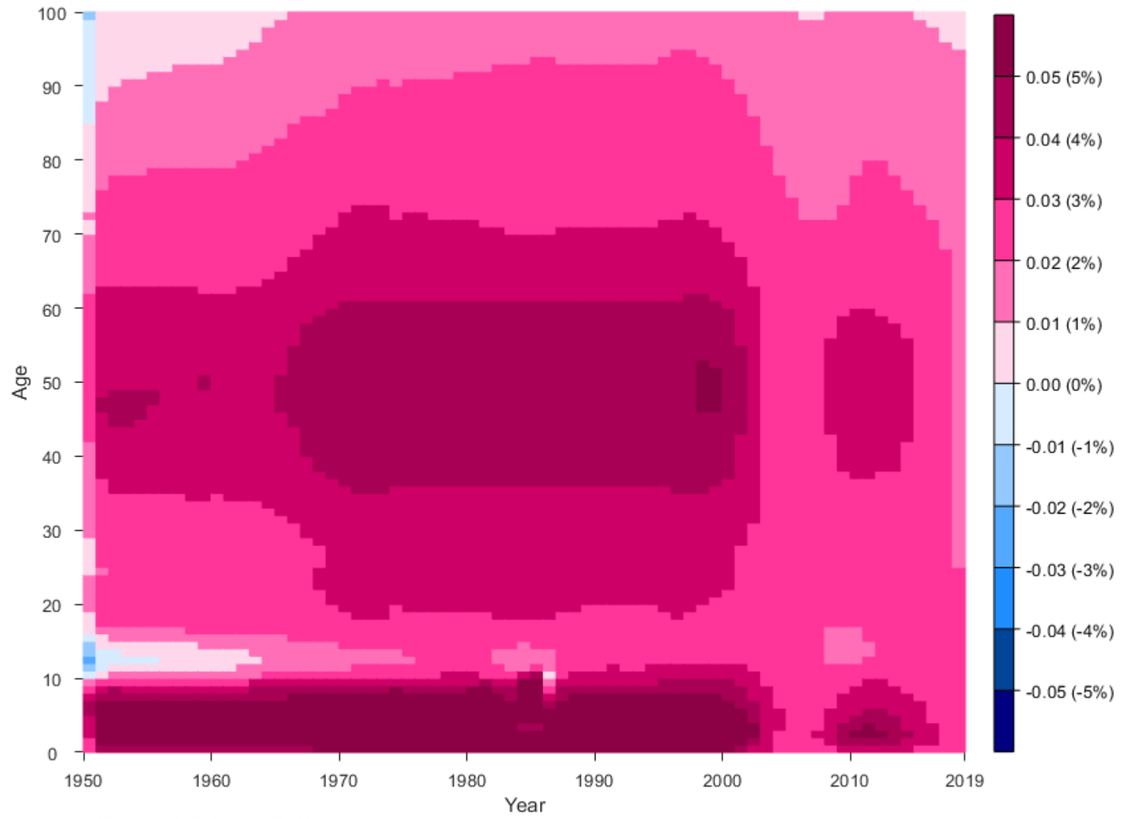
Martinique

Males



iters=1, nblobs=70, varprc=97.3907, var0=158.224

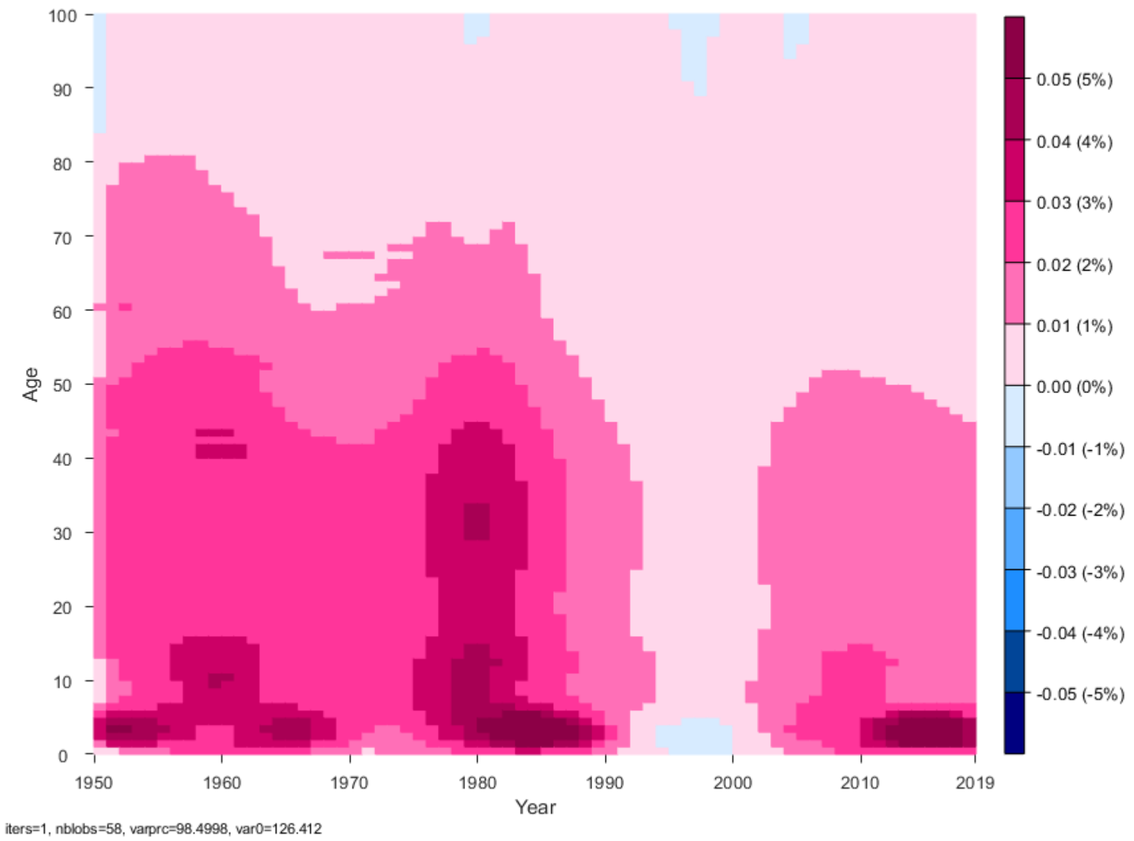
Females



iters=1, nblobs=67, varprc=96.4734, var0=175.026

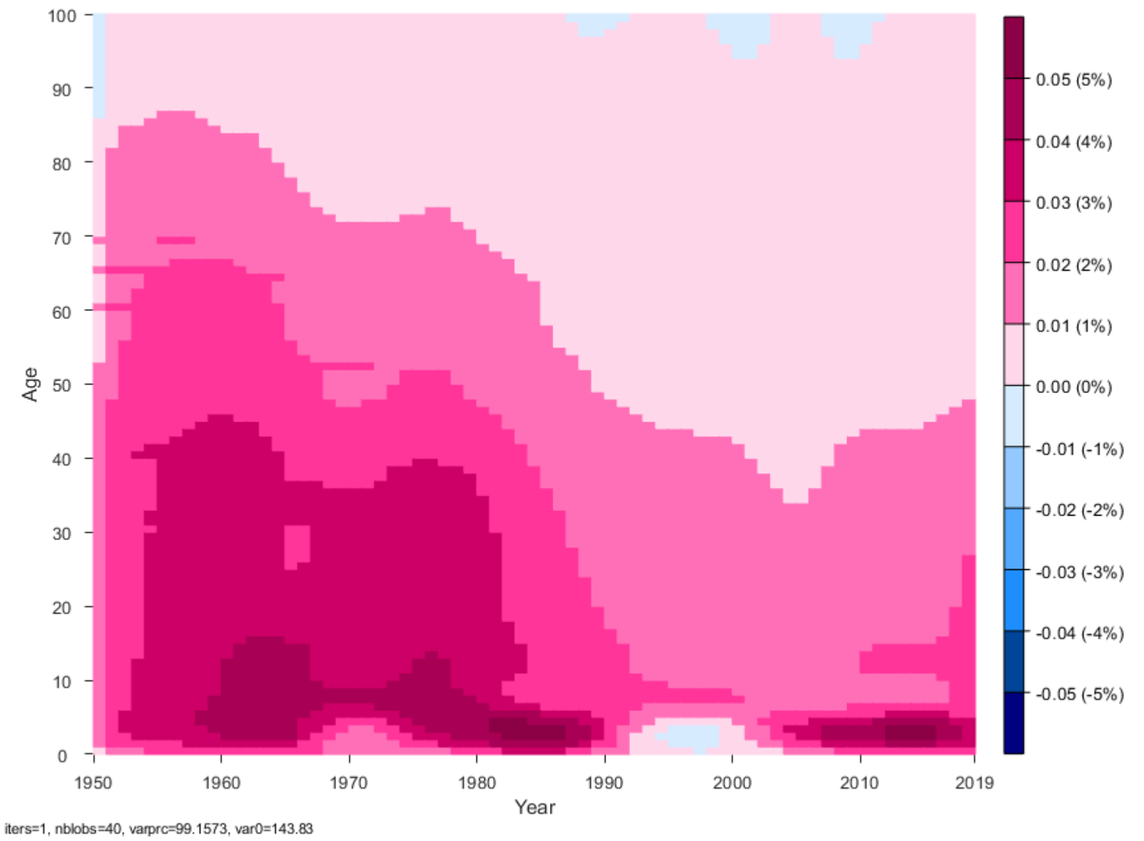
Mauritania

Males



iters=1, nblobs=58, varprc=98.4998, var0=126.412

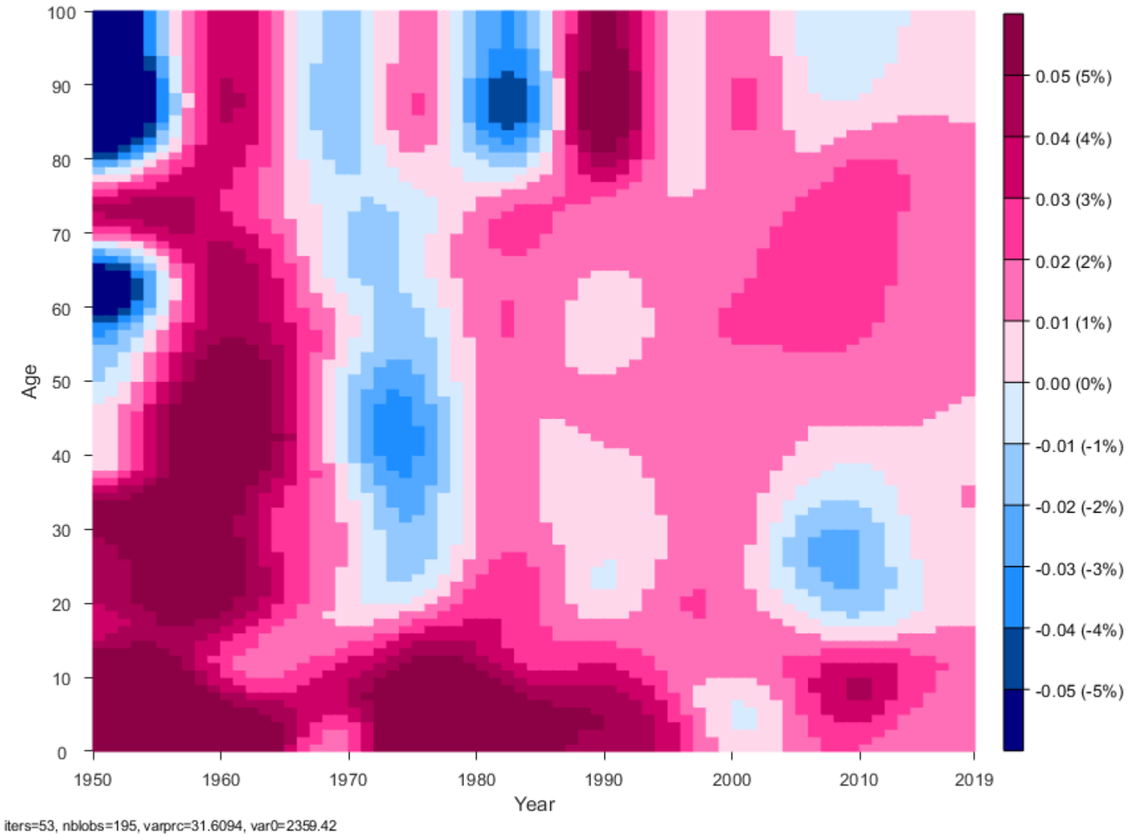
Females



iters=1, nblobs=40, varprc=99.1573, var0=143.83

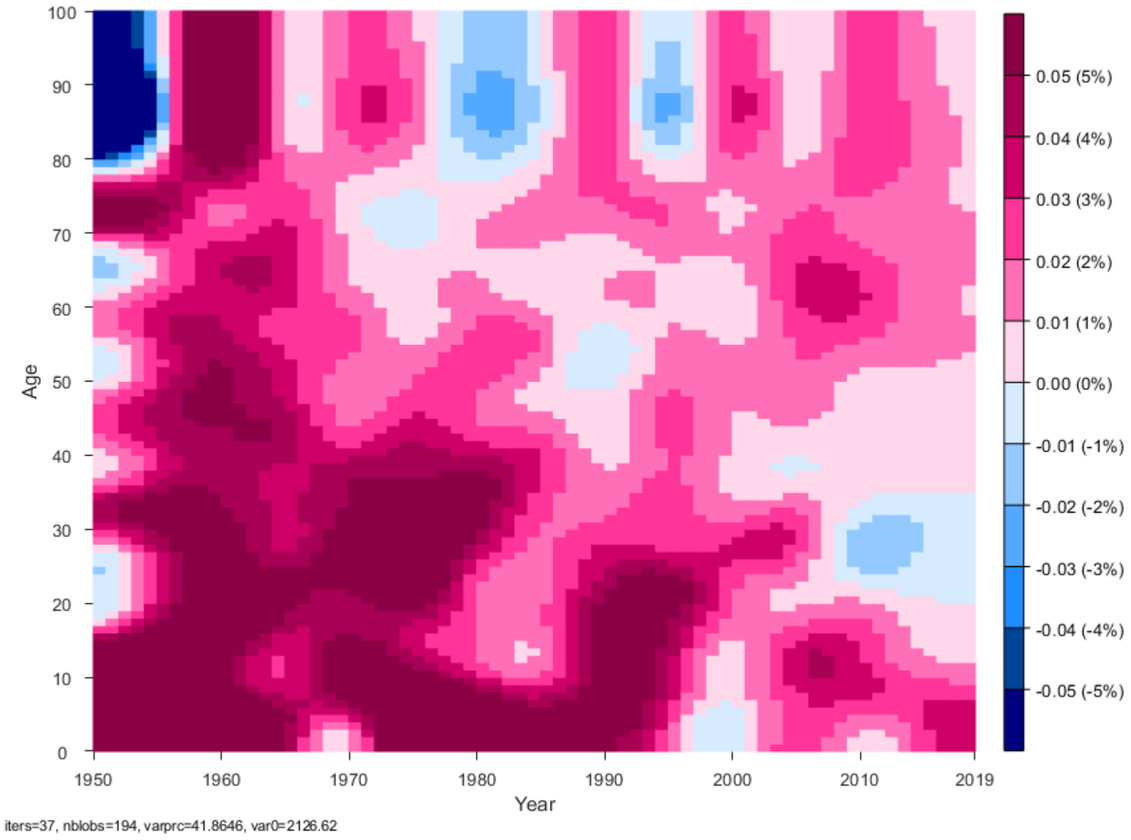
Mauritius

Males



iters=53, nblobs=195, varprc=31.6094, var0=2359.42

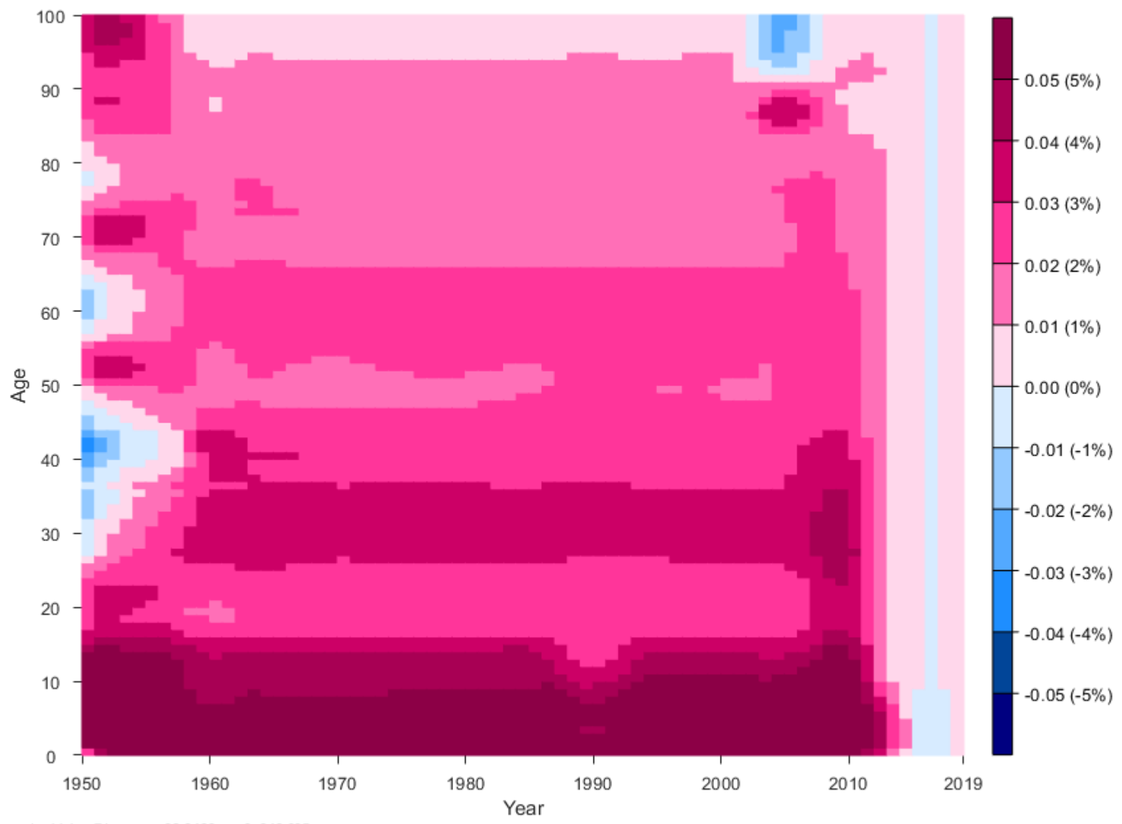
Females



iters=37, nblobs=194, varprc=41.8646, var0=2126.62

Mayotte

Males



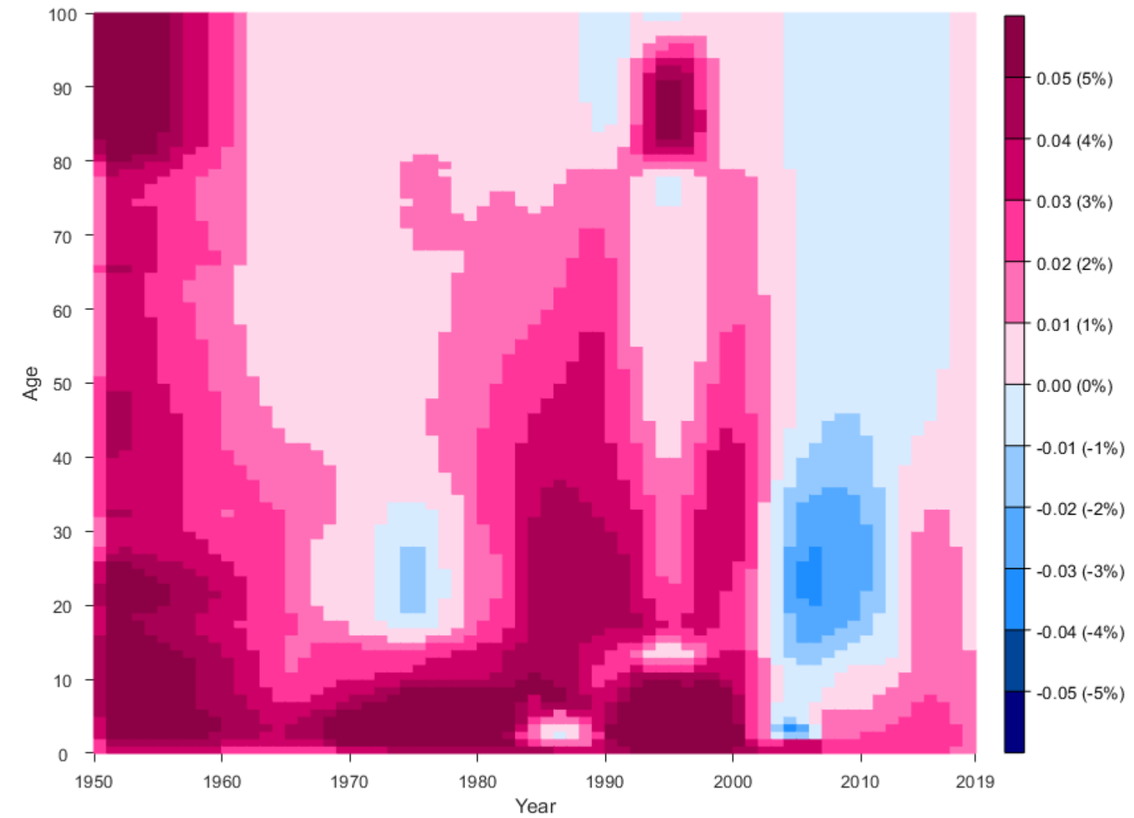
iters=1, nblobs=71, varprc=98.3463, var0=348.095

Females

iters=1, nblobs=85, varprc=97.8995, var0=551.834

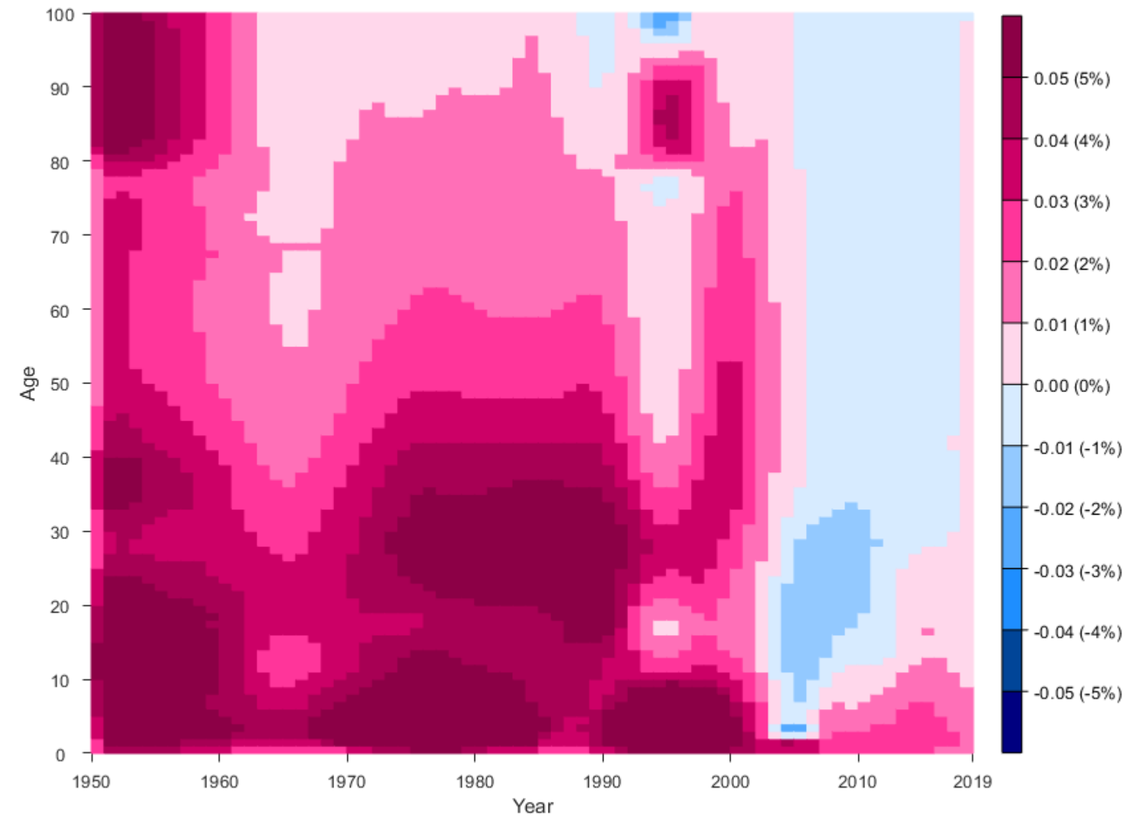
Mexico

Males



iters=1, nblobs=115, varprc=97.7308, var0=475.541

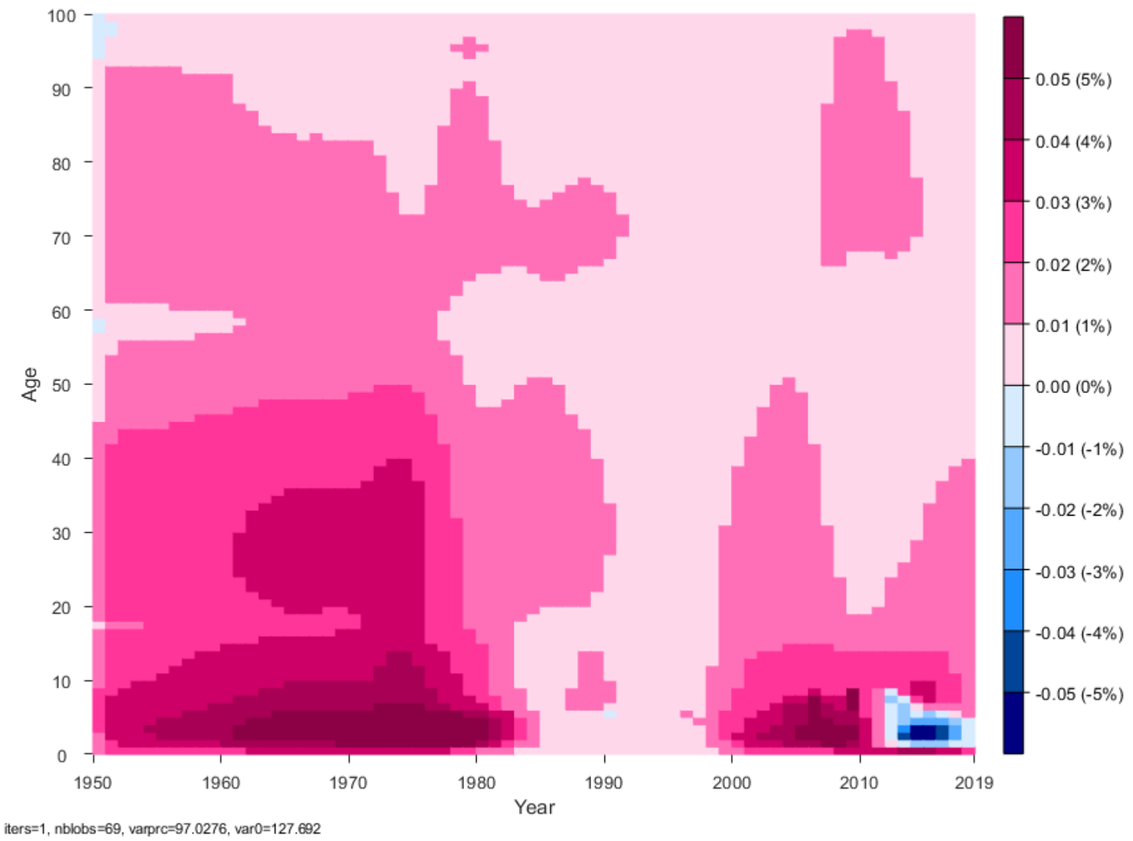
Females



iters=1, nblobs=84, varprc=98.4426, var0=489.514

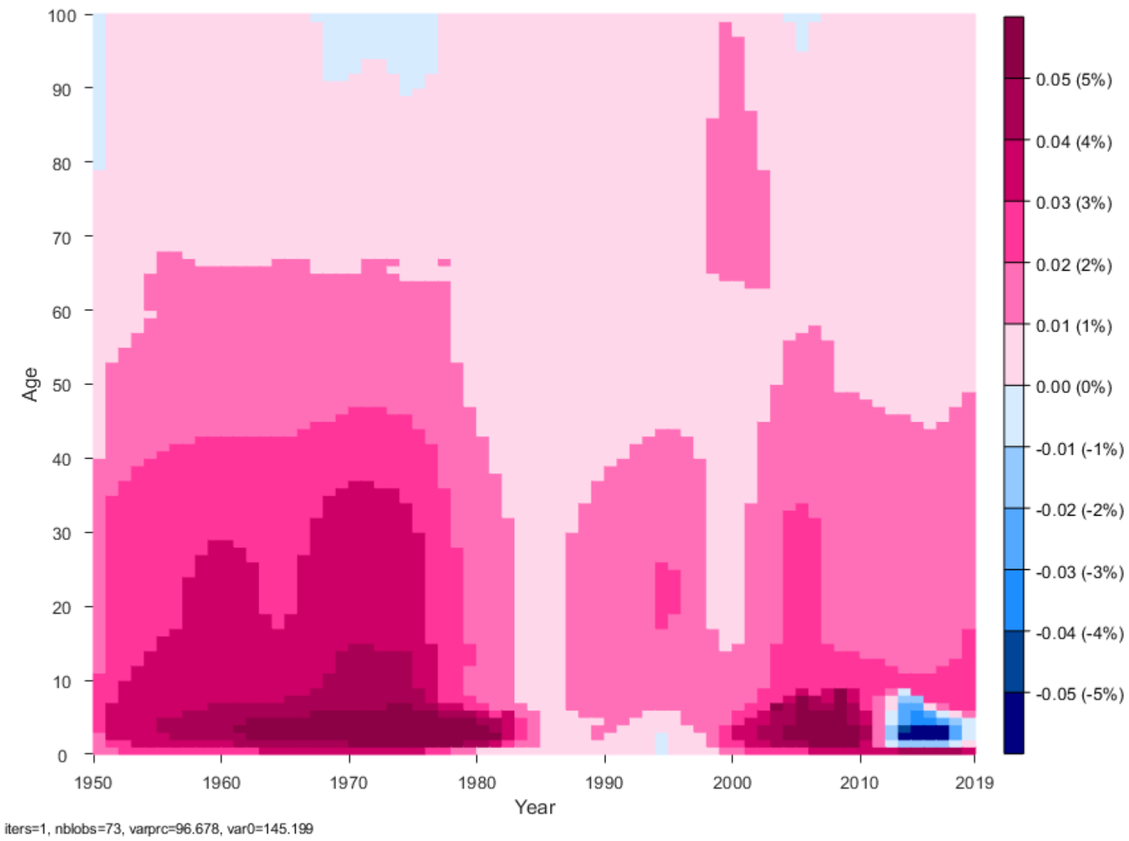
Micronesia (Fed. States of)

Males



iters=1, nblobs=69, varprc=97.0276, var0=127.692

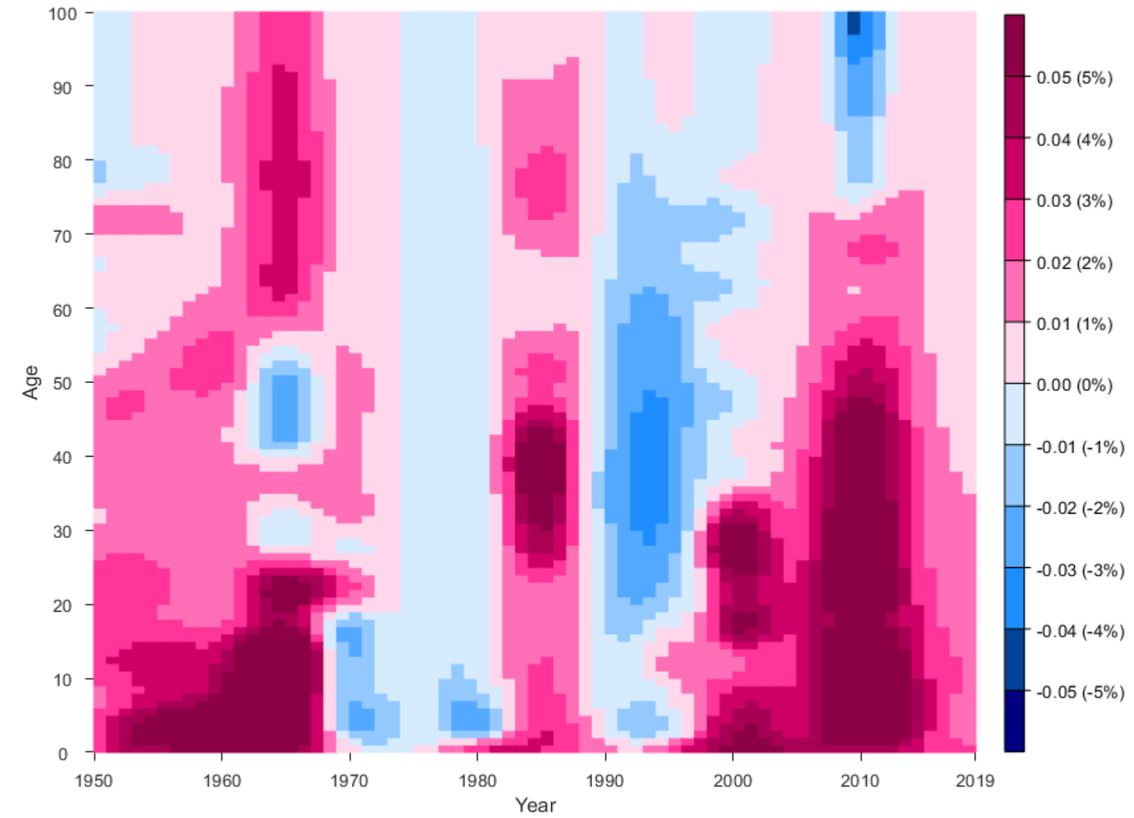
Females



iters=1, nblobs=73, varprc=96.678, var0=145.199

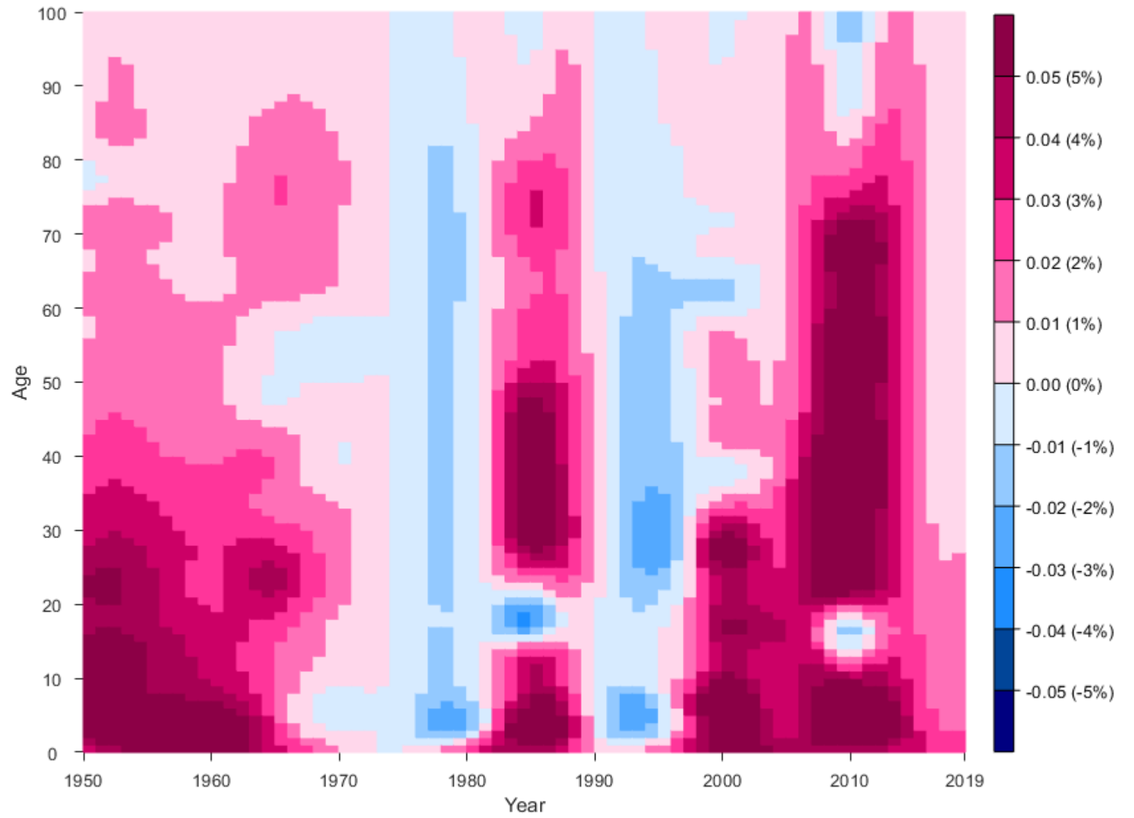
Republic of Moldova

Males



iters=7, nblobs=181, varprc=82.093, var0=681.341

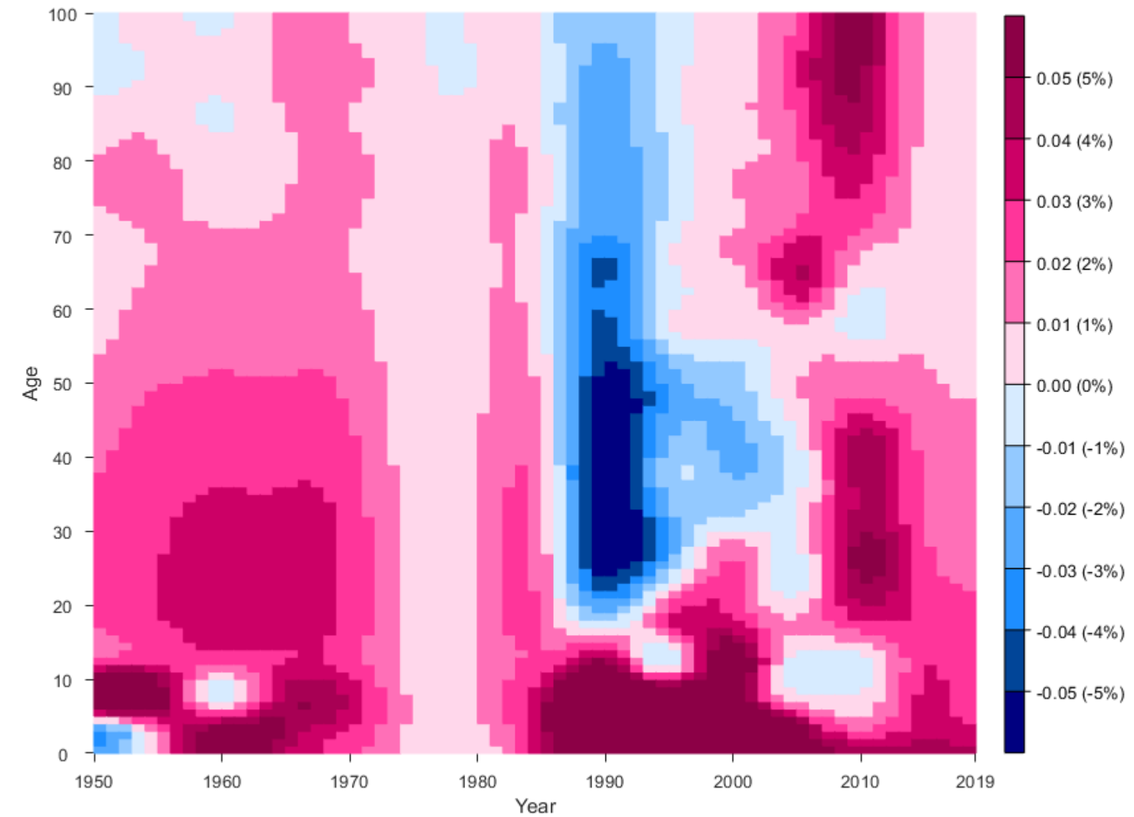
Females



iters=9, nblobs=189, varprc=78.5102, var0=542.71

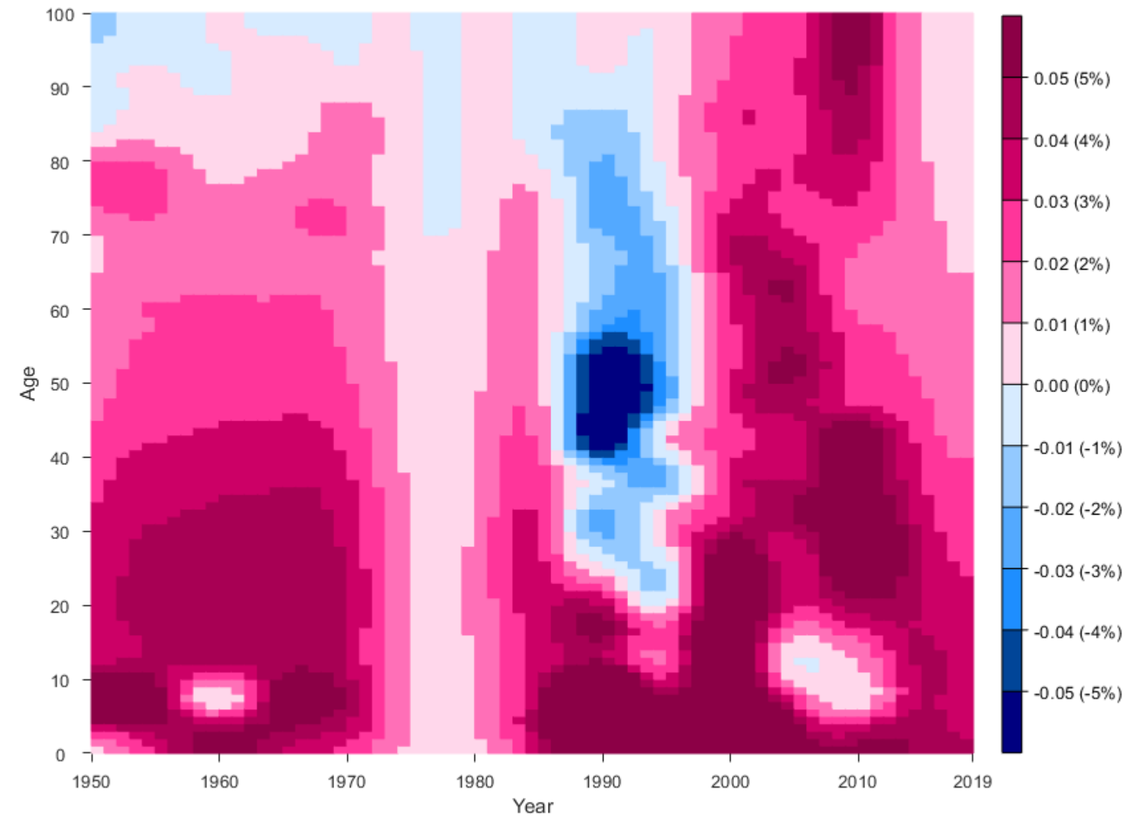
Mongolia

Males



iters=16, nblobs=189, varprc=71.4862, var0=827.081

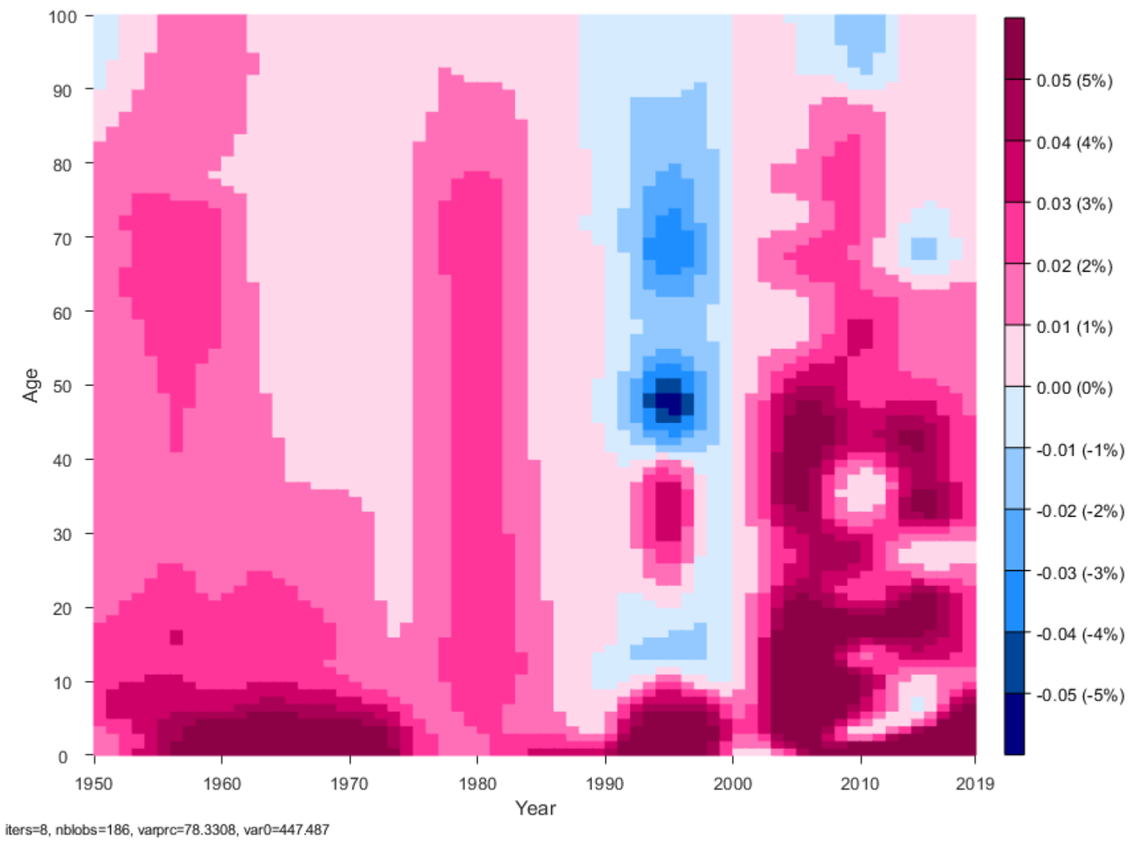
Females



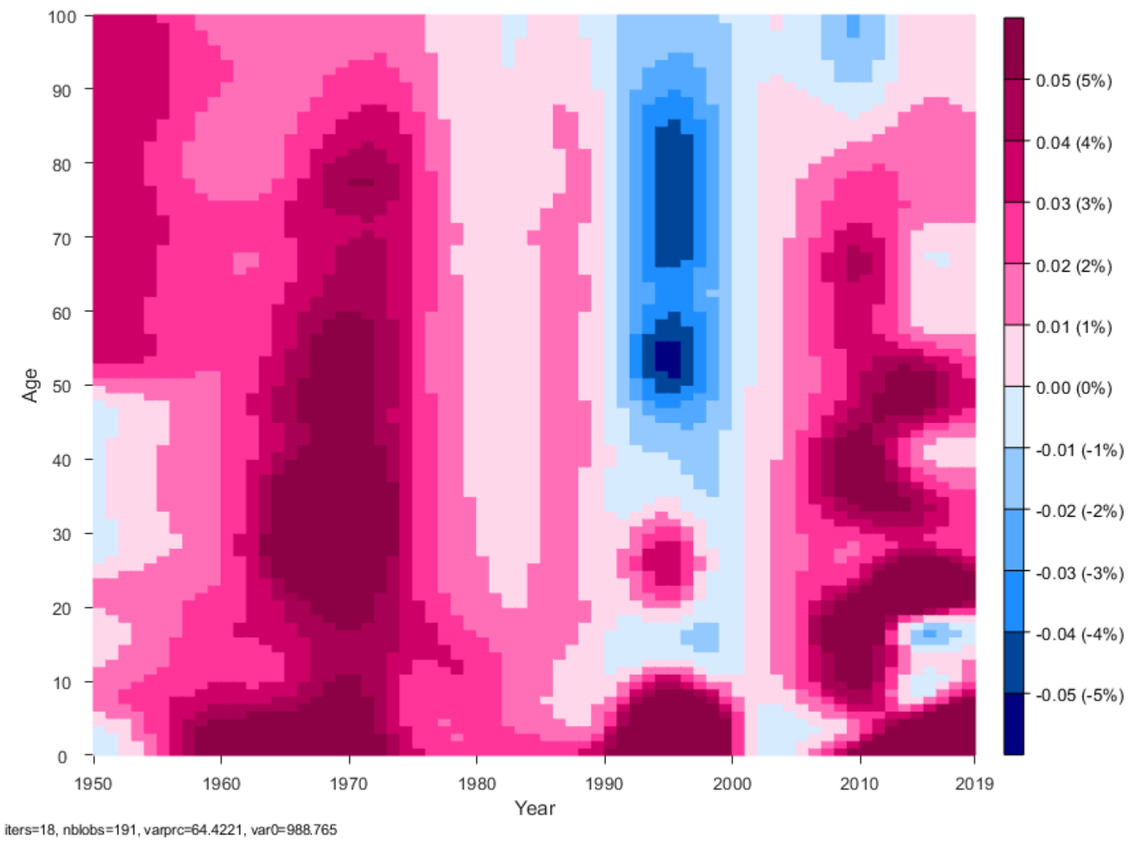
iters=15, nblobs=193, varprc=71.7804, var0=879.407

Montenegro

Males

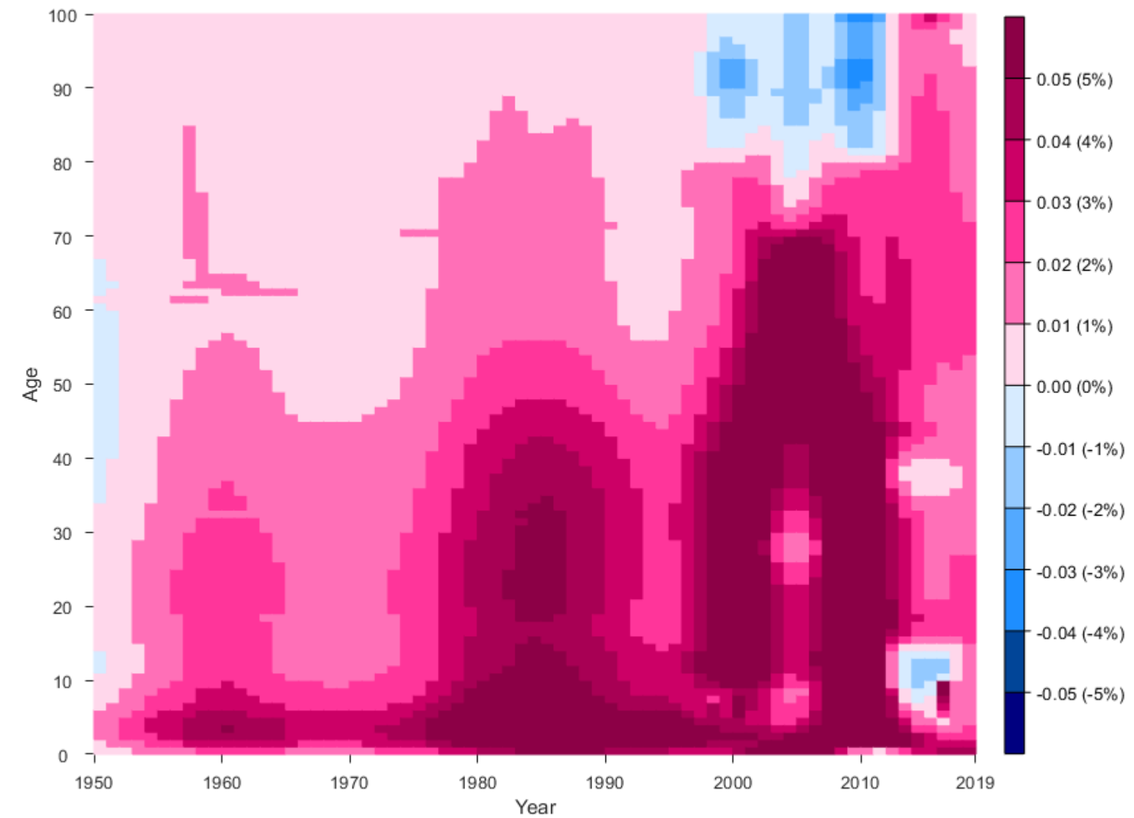


Females

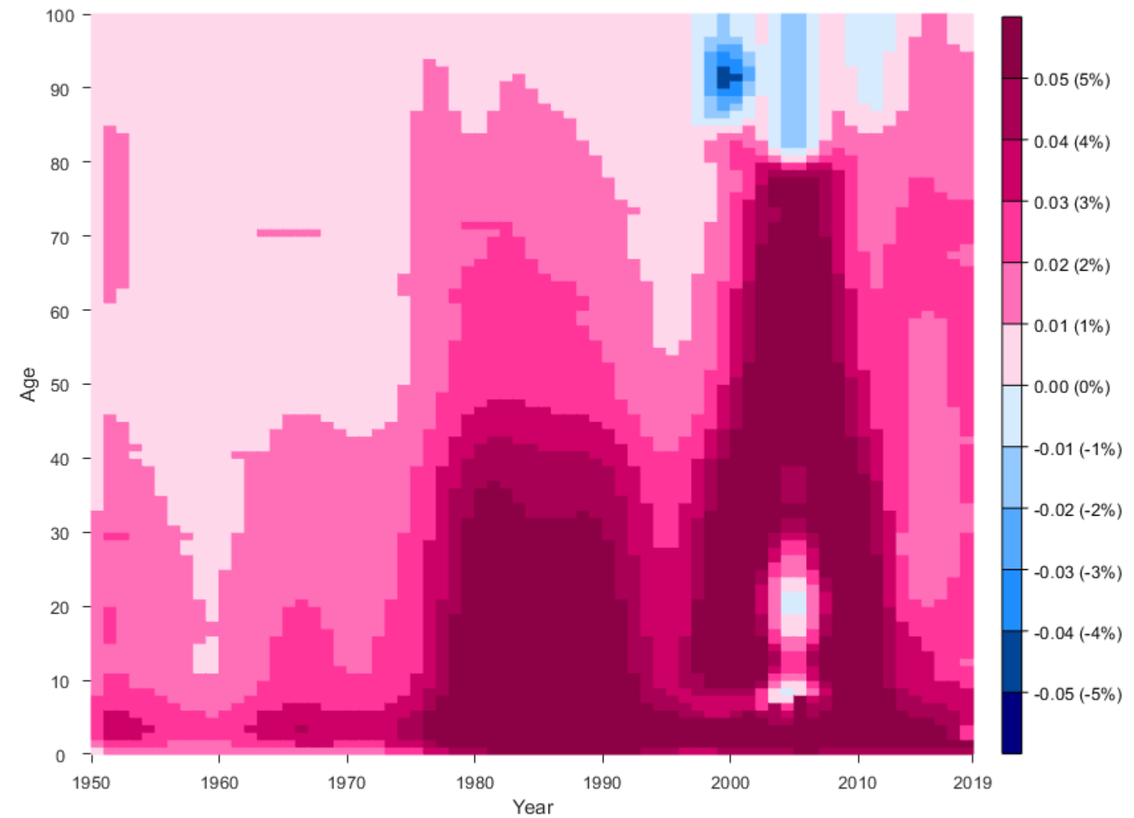


Morocco

Males

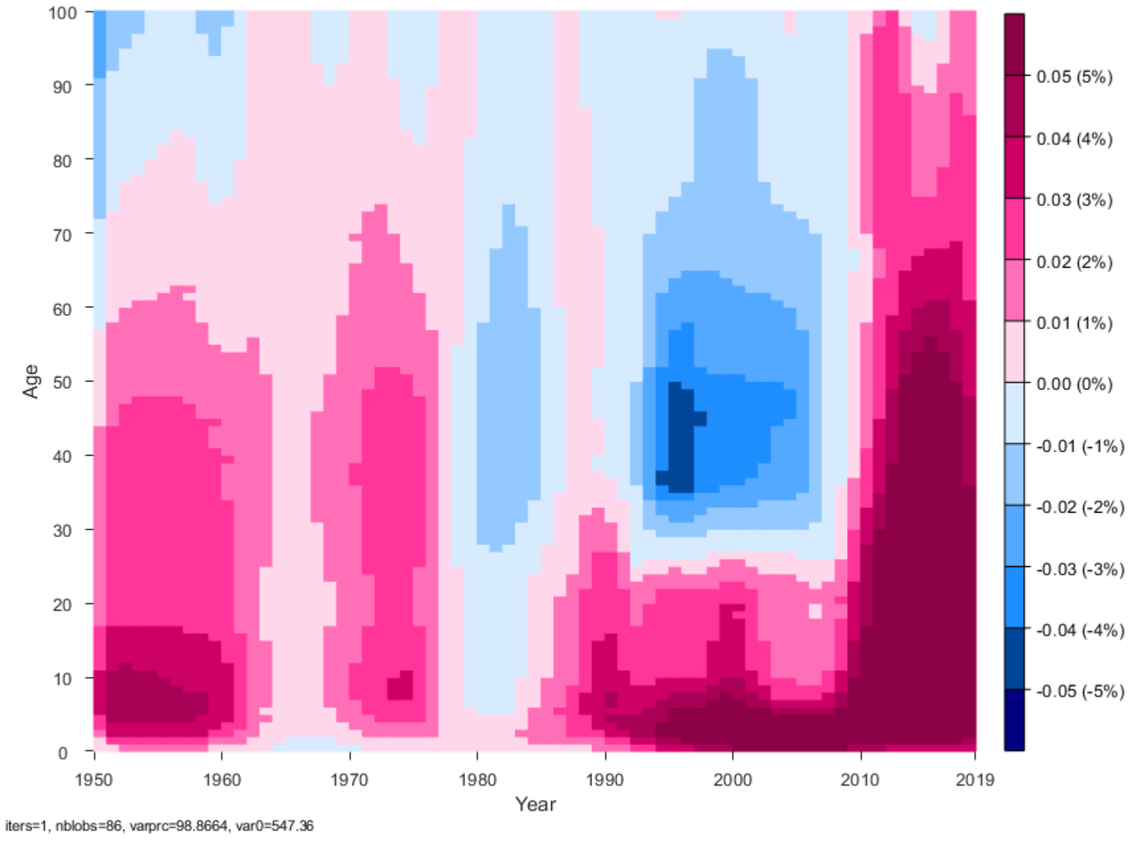


Females

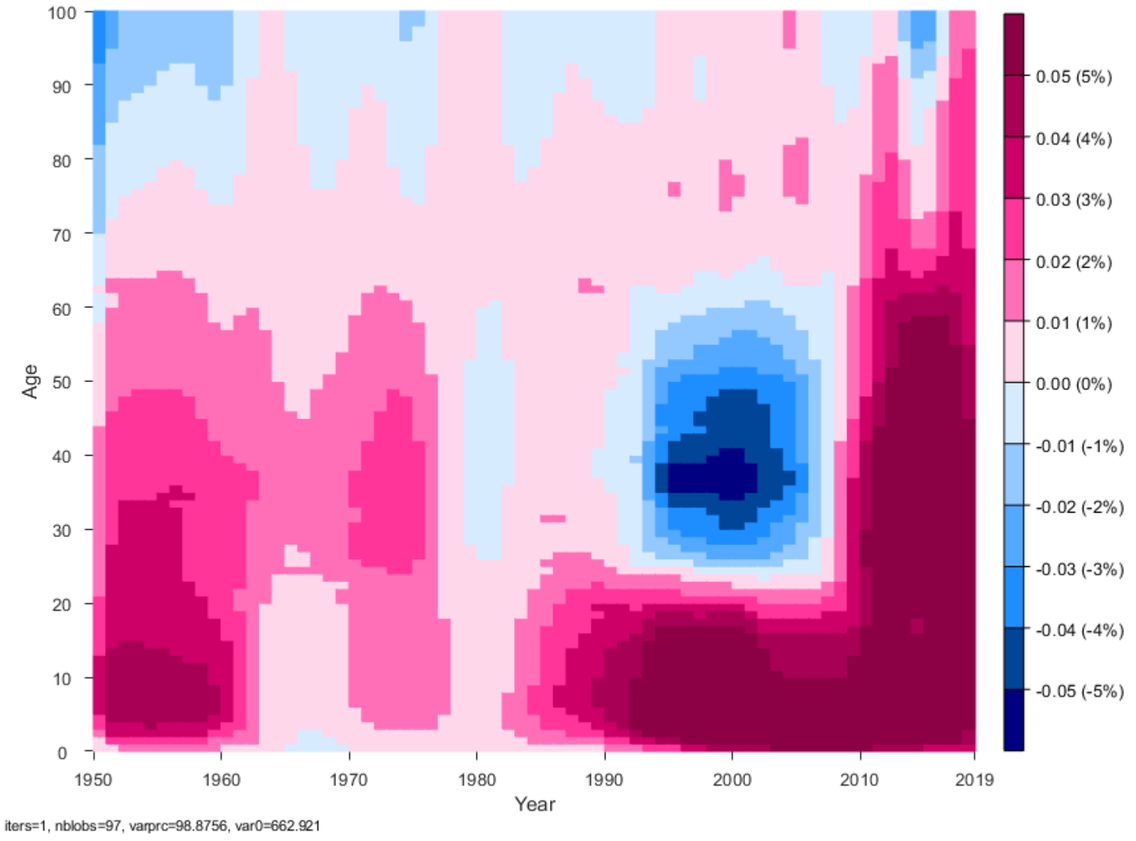


Mozambique

Males

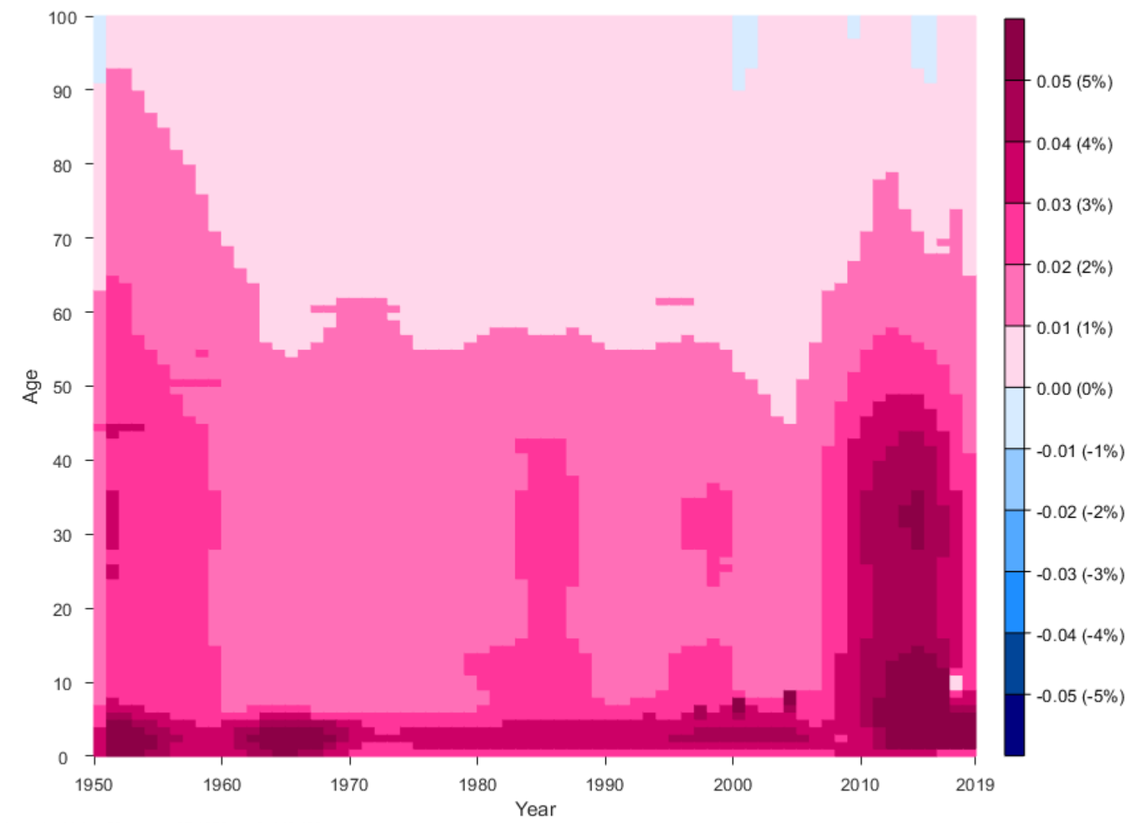


Females



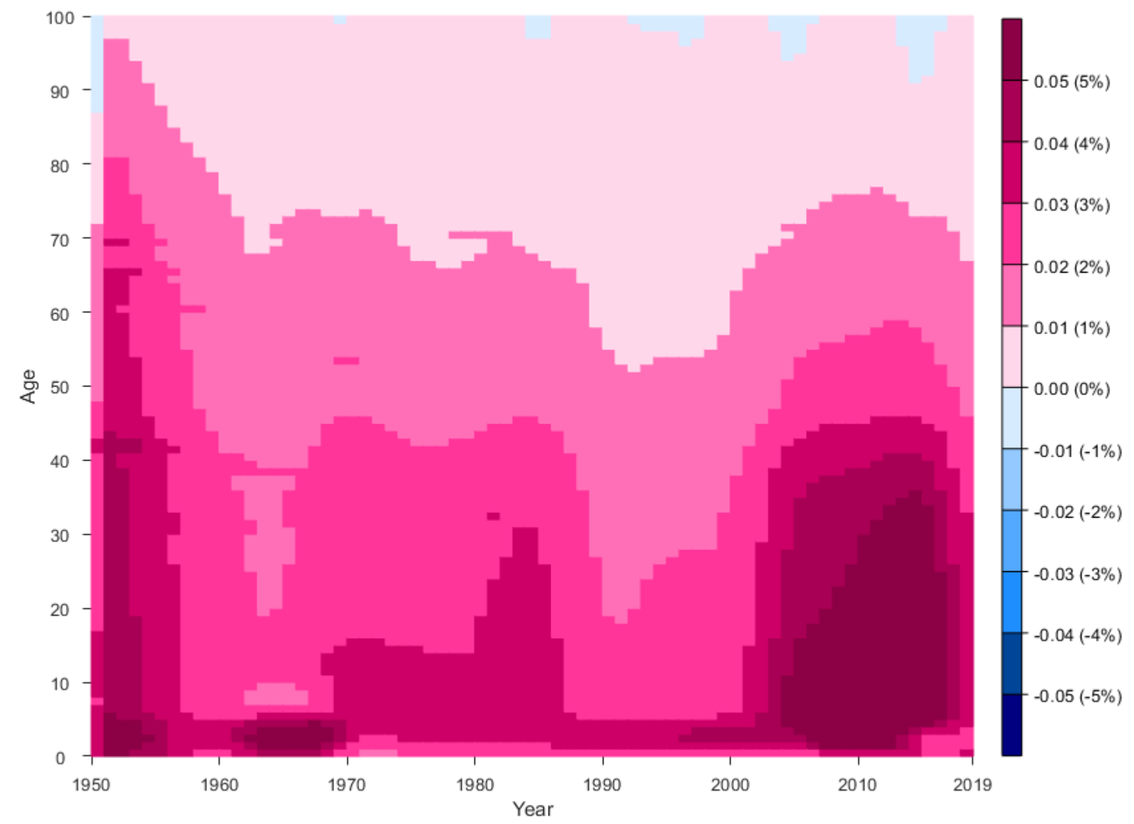
Myanmar

Males



iters=1, nblobs=50, varprc=97.1853, var0=143.138

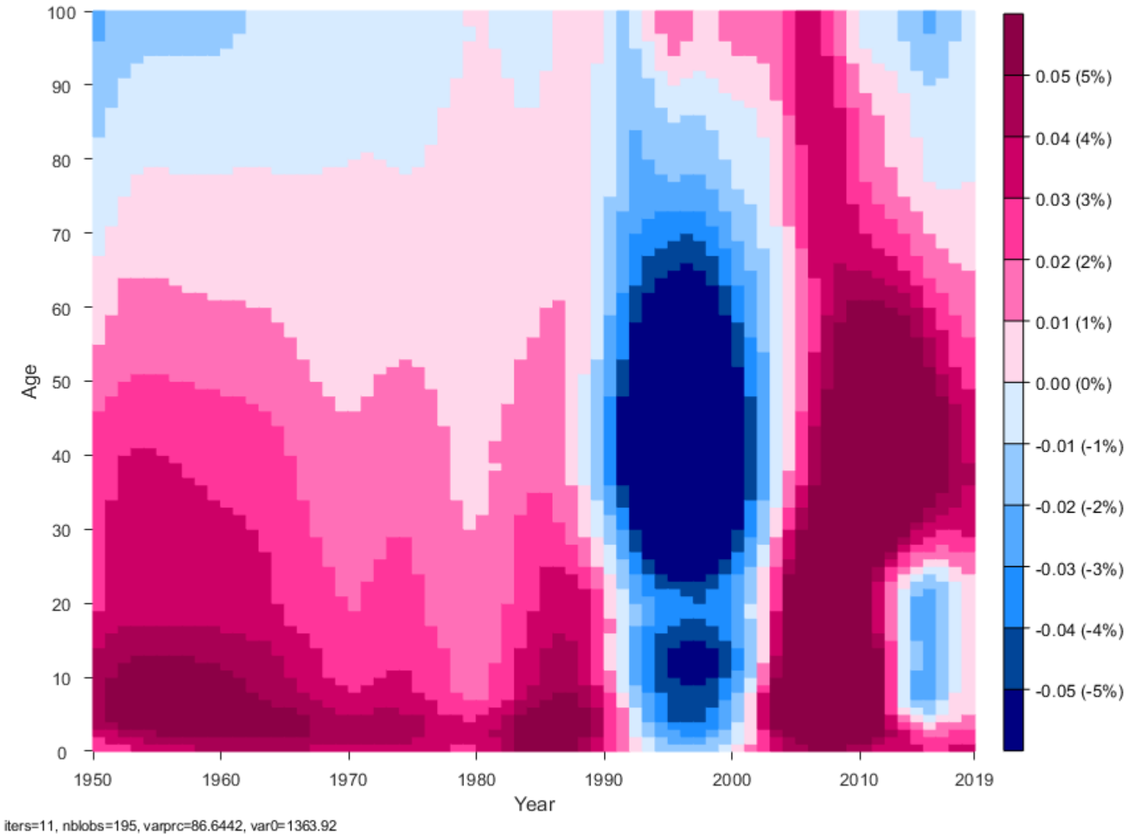
Females



iters=1, nblobs=46, varprc=98.7975, var0=209.122

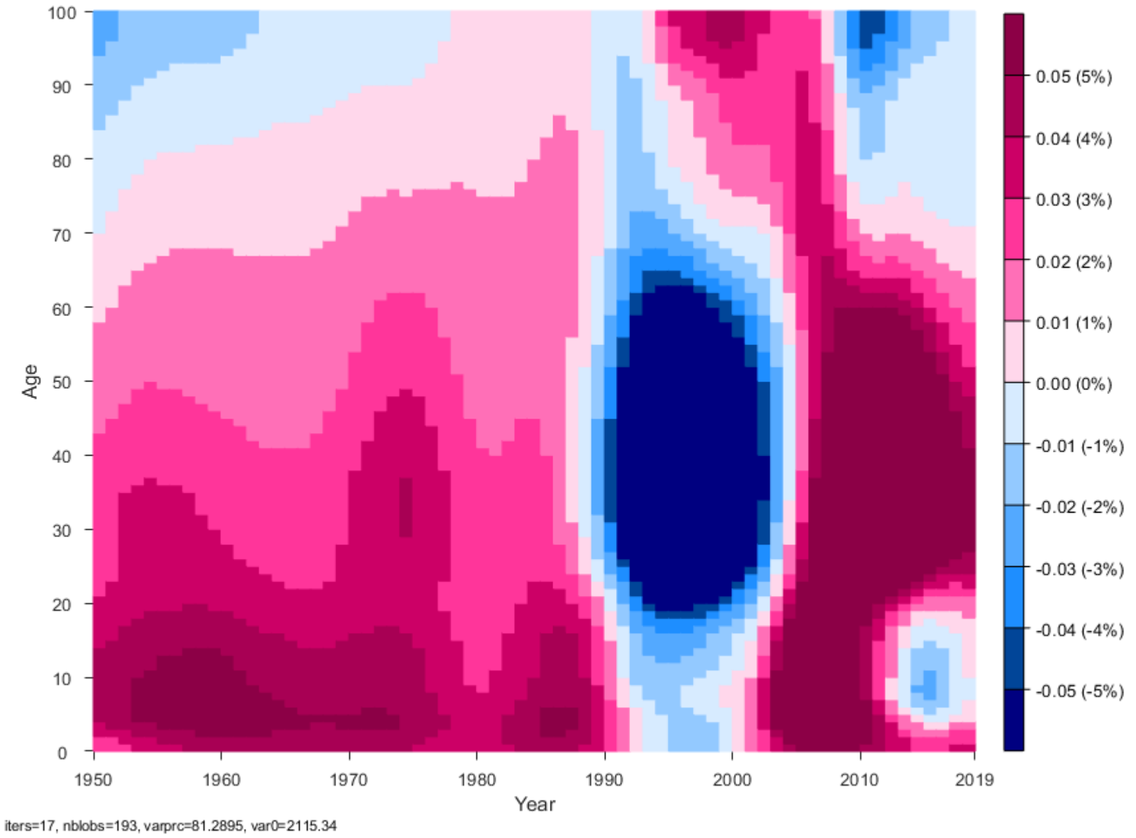
Namibia

Males



iters=11, nblobs=195, varprc=86.6442, var0=1363.92

Females



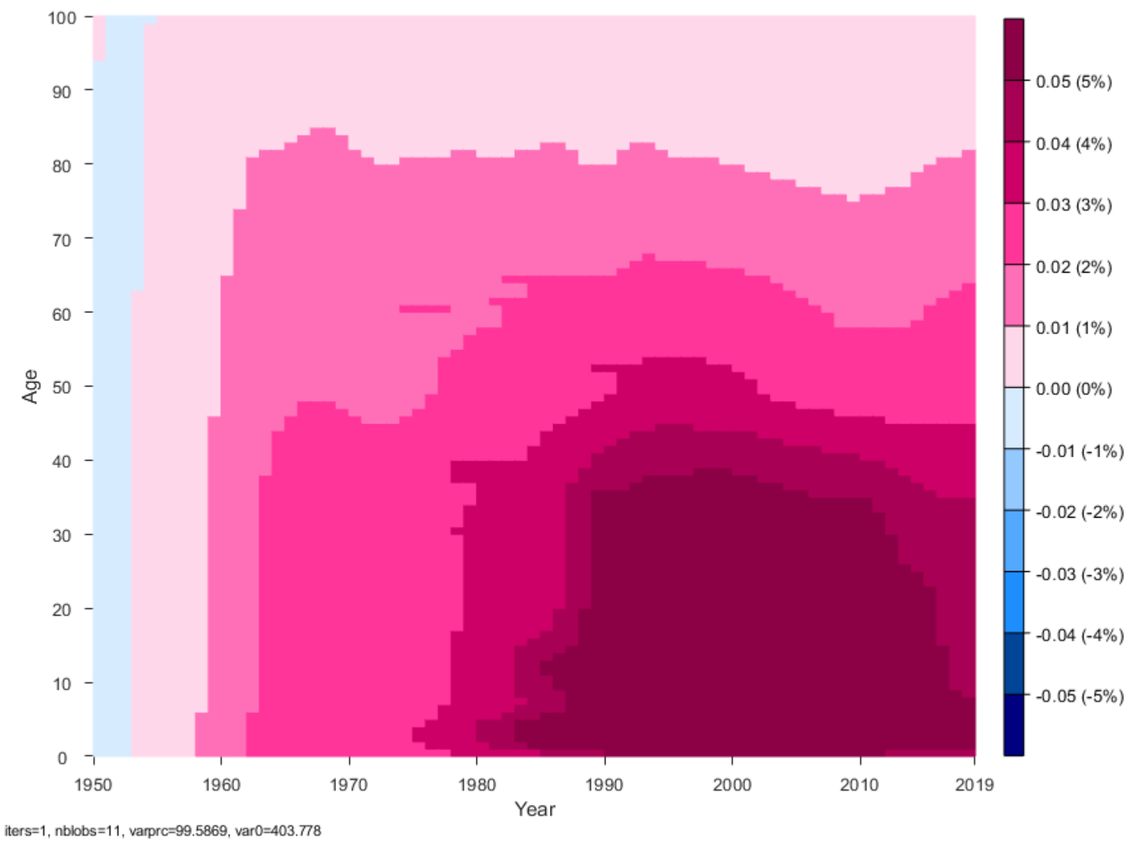
iters=17, nblobs=193, varprc=81.2895, var0=2115.34

Nepal

Males

iters=1, nblobs=19, varprc=99.1137, var0=304.847

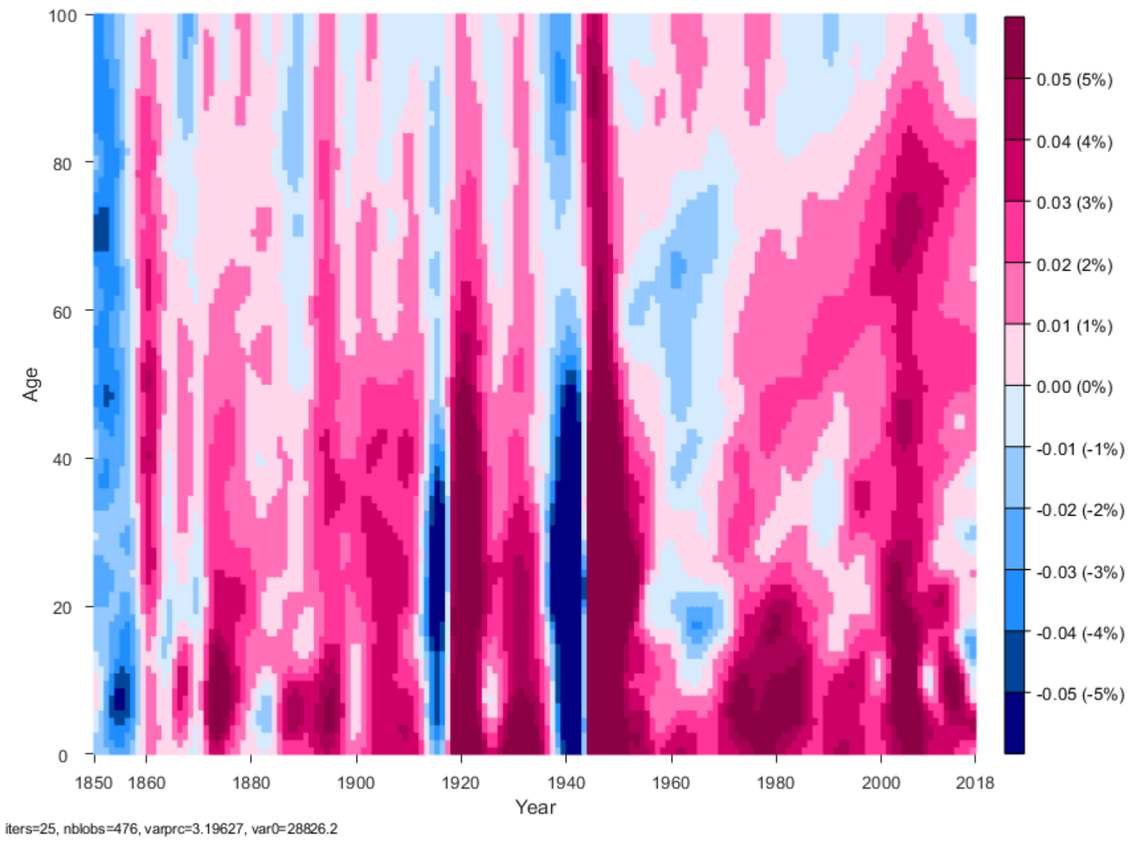
Females



iters=1, nblobs=11, varprc=99.5869, var0=403.778

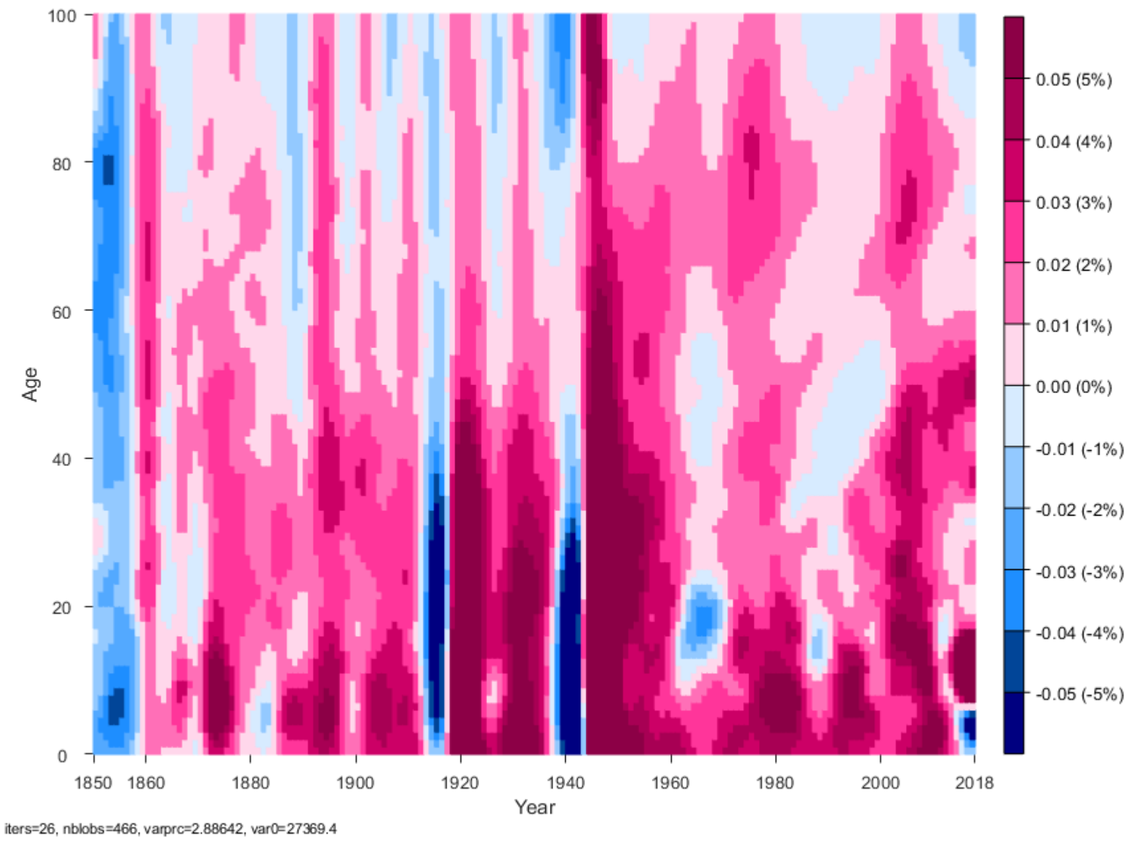
Netherlands

Males



iters=25, nblobs=476, varprc=3.19627, var0=28826.2

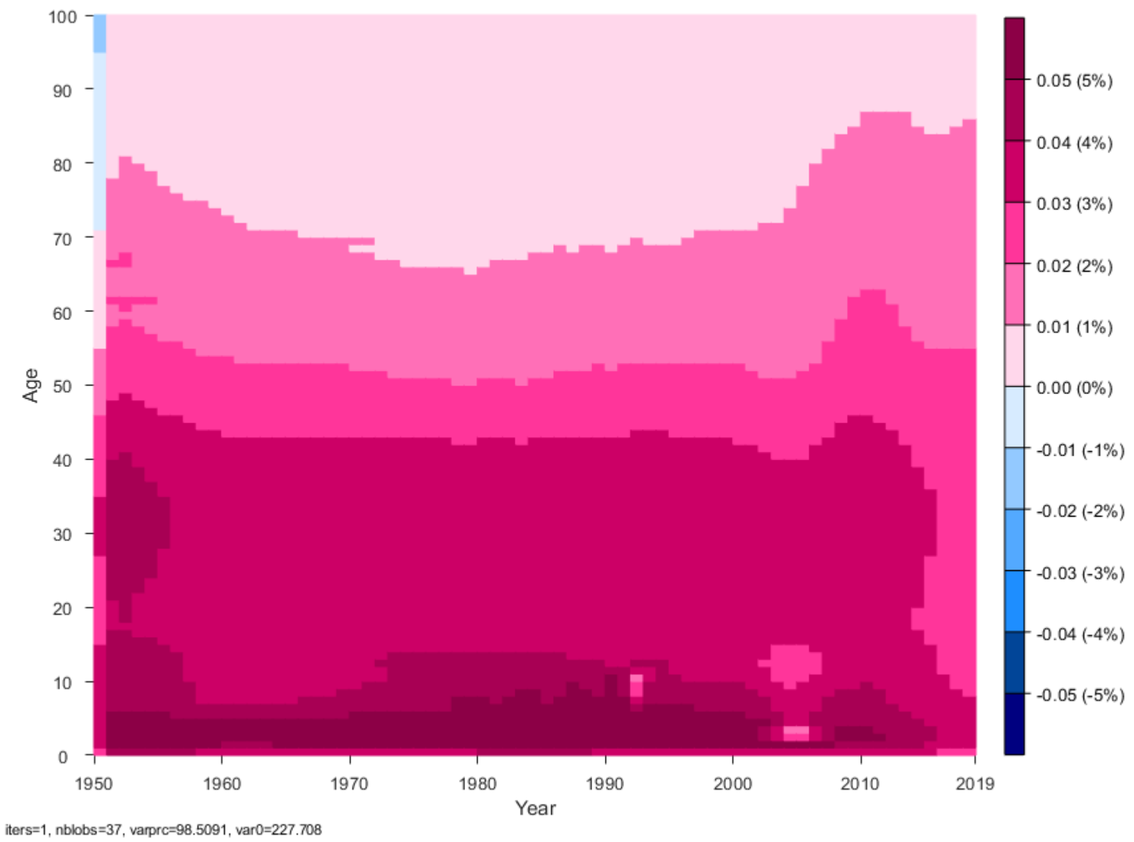
Females



iters=26, nblobs=466, varprc=2.88642, var0=27369.4

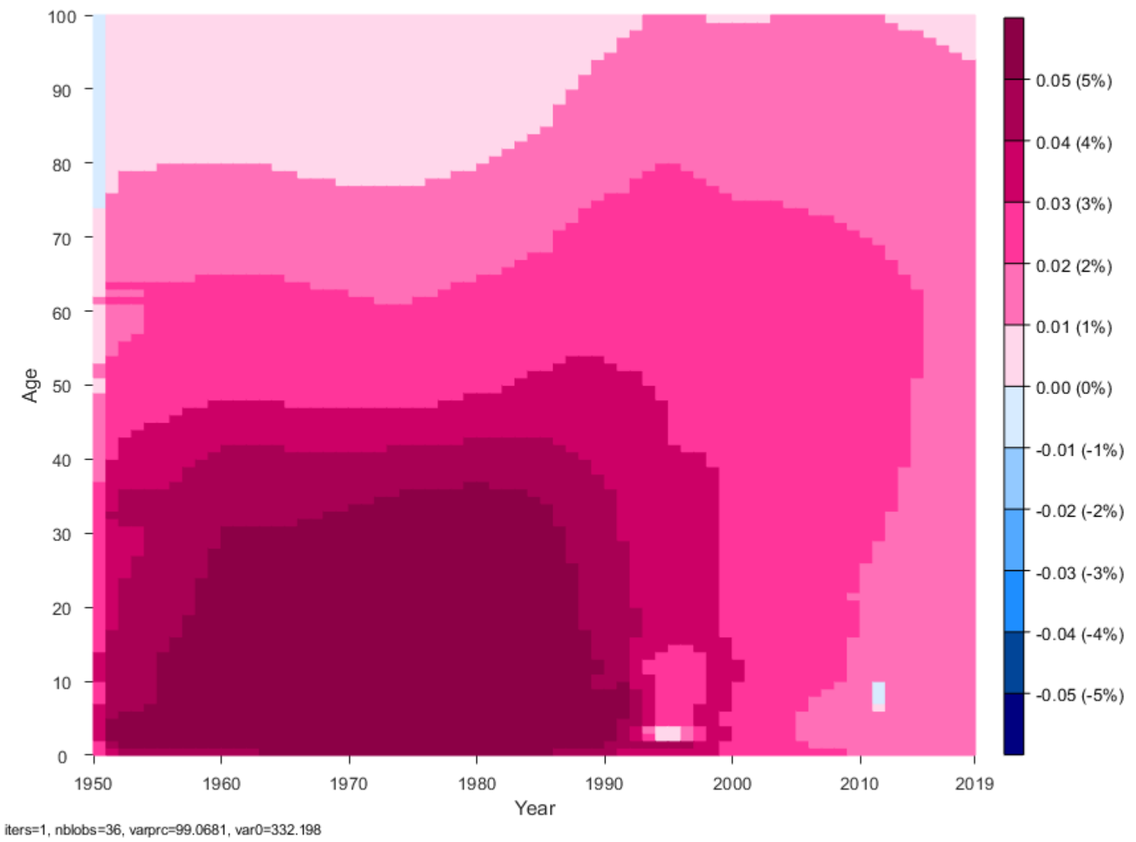
New Caledonia

Males



iters=1, nblobs=37, varprc=98.5091, var0=227.708

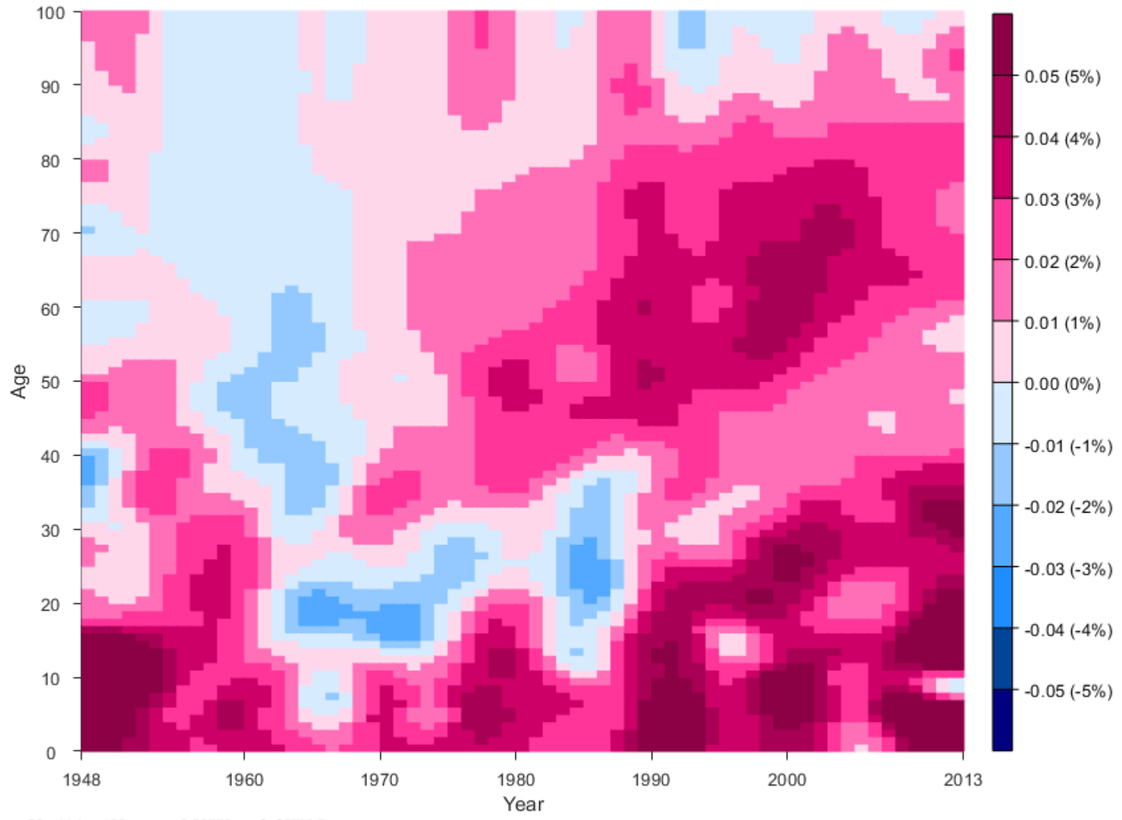
Females



iters=1, nblobs=36, varprc=99.0681, var0=332.198

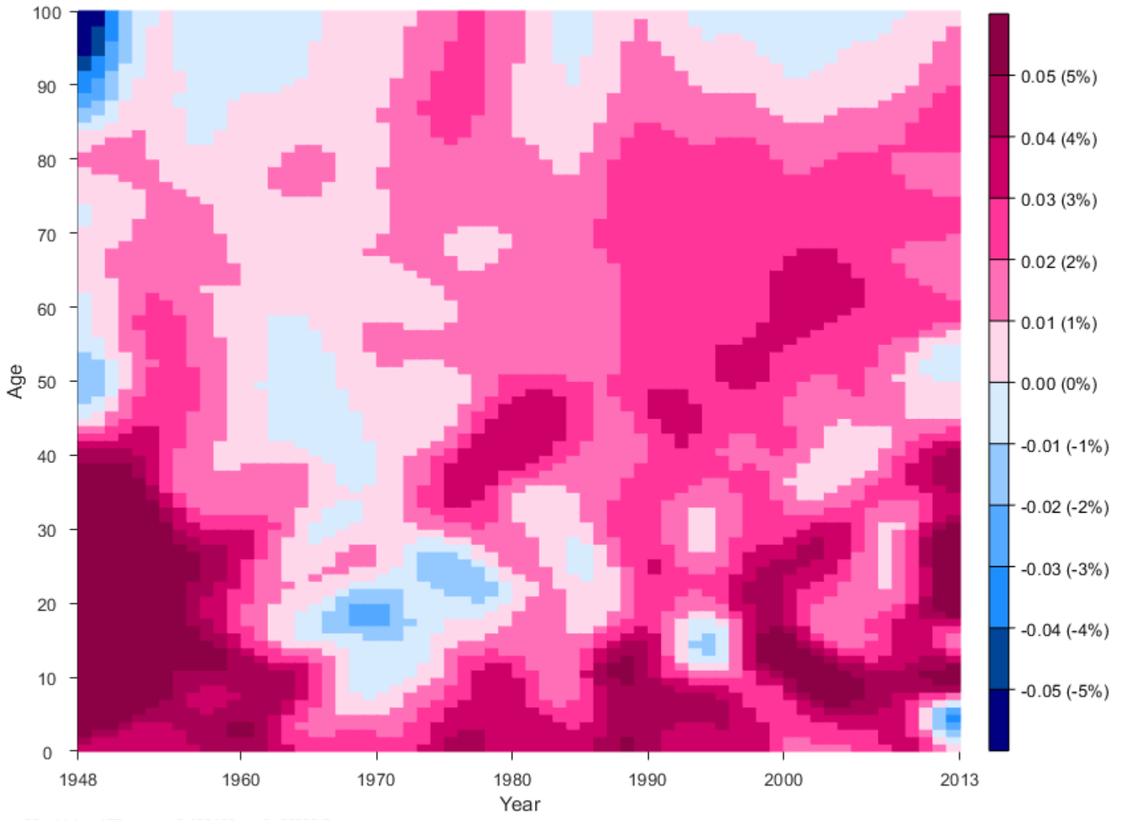
New Zealand

Males



iters=28, nblobs=185, varprc=0.58773, var0=65763.7

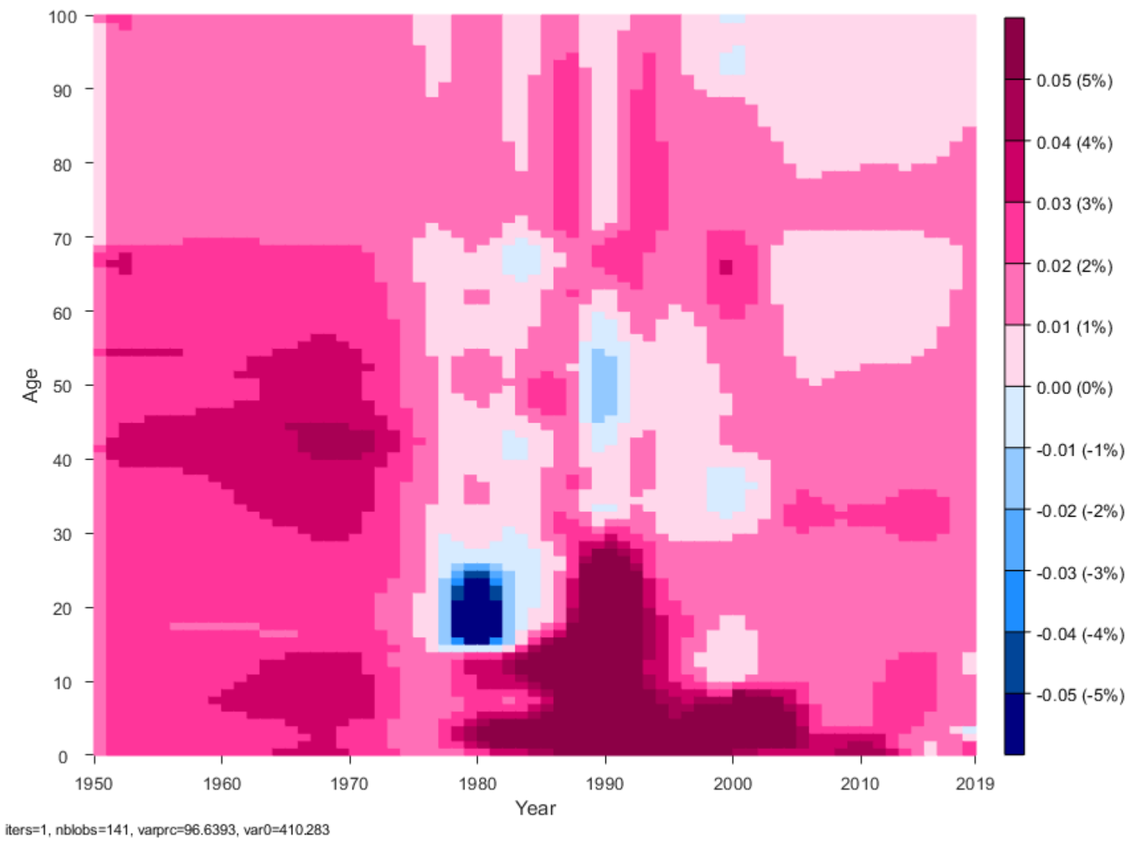
Females



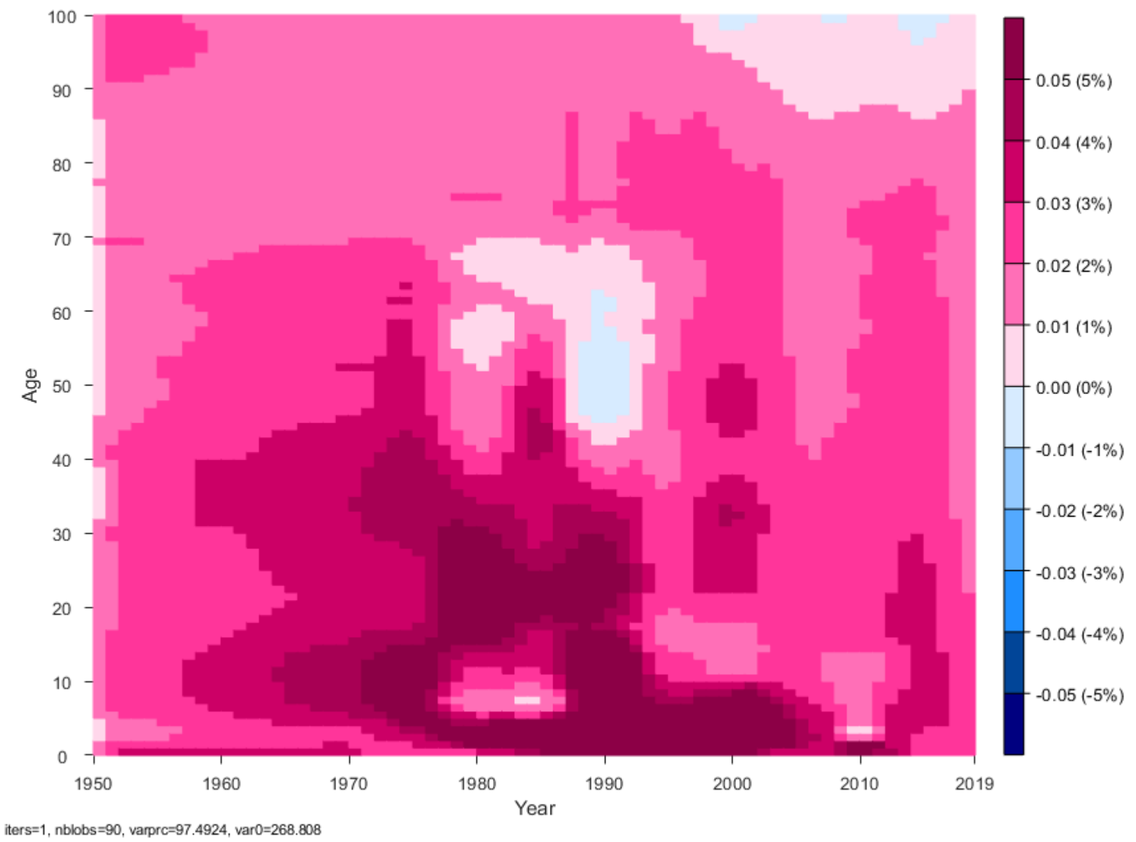
iters=35, nblobs=177, varprc=0.470489, var0=93586.7

Nicaragua

Males

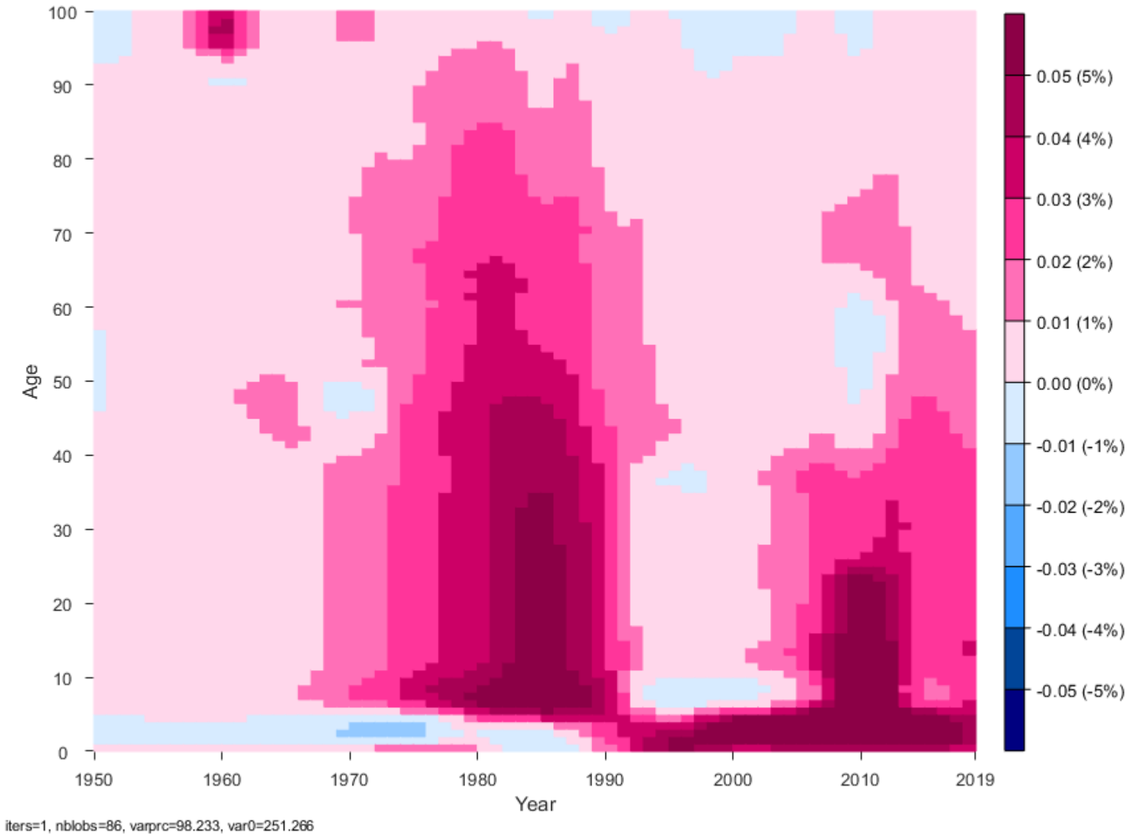


Females

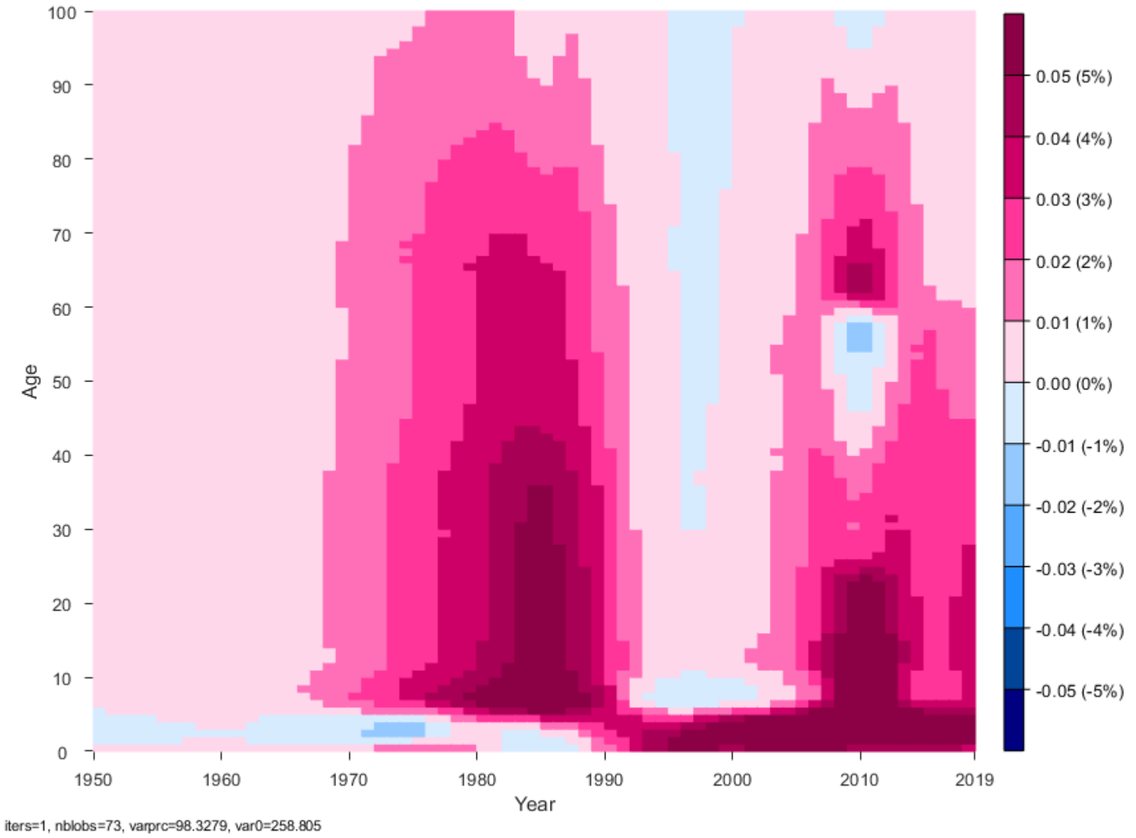


Niger

Males

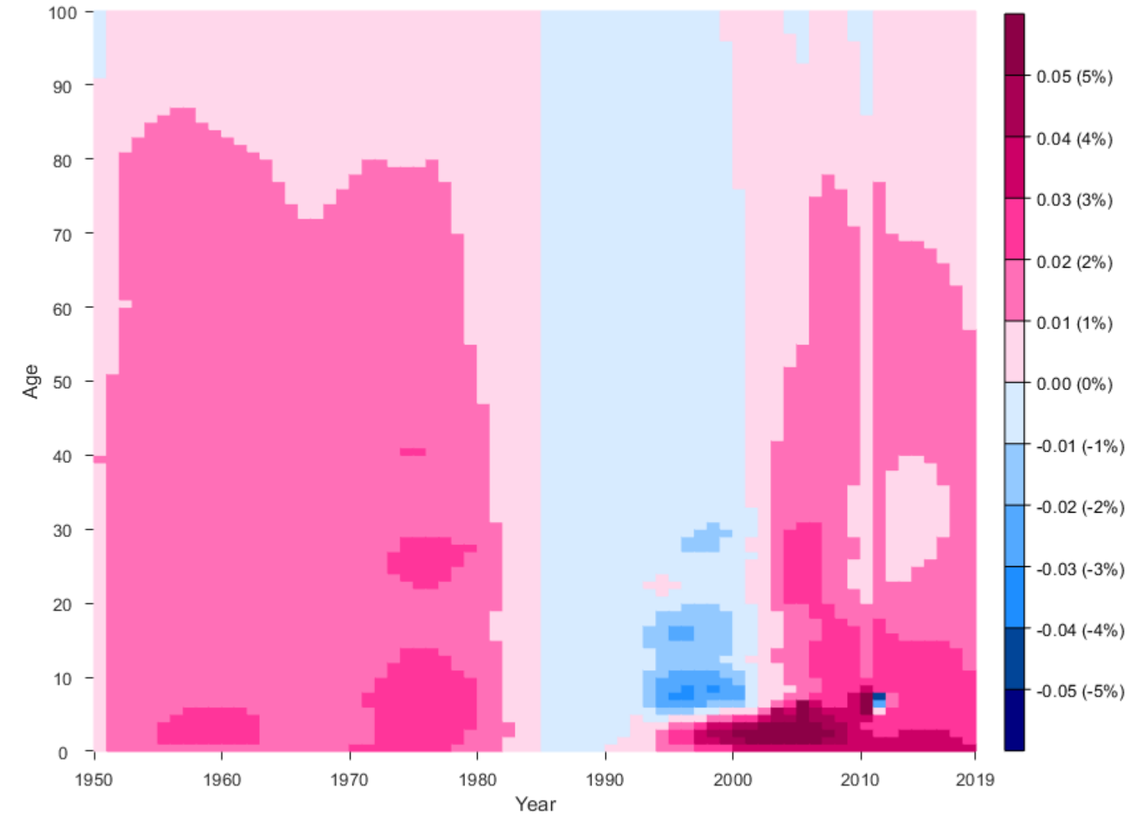


Females



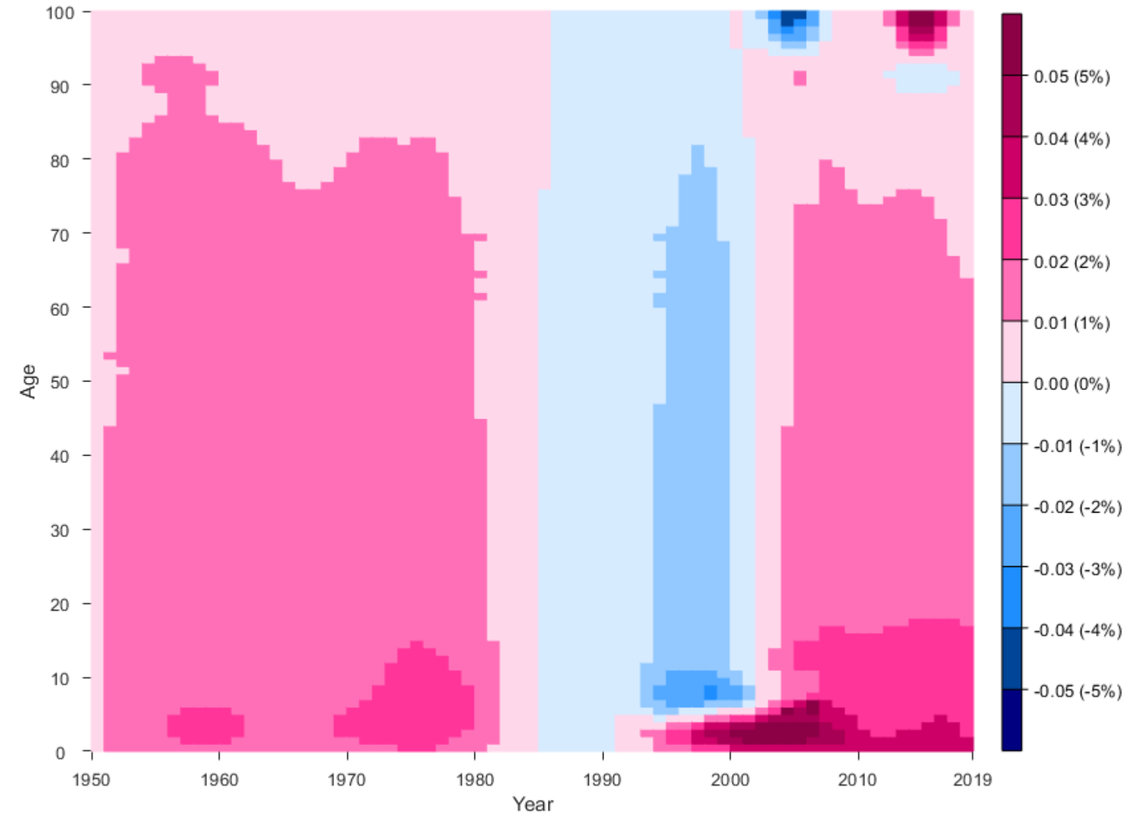
Nigeria

Males



iters=1, nblobs=55, varprc=94.1473, var0=93.6532

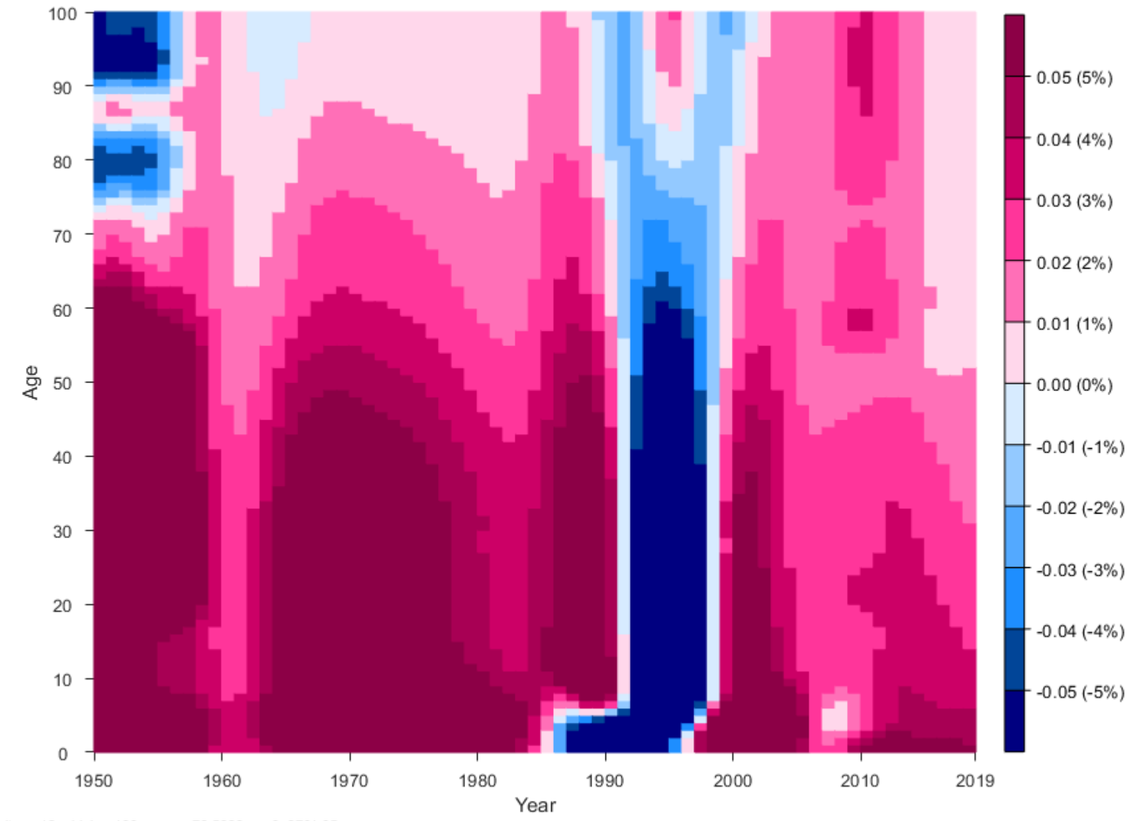
Females



iters=1, nblobs=71, varprc=98.1654, var0=114.138

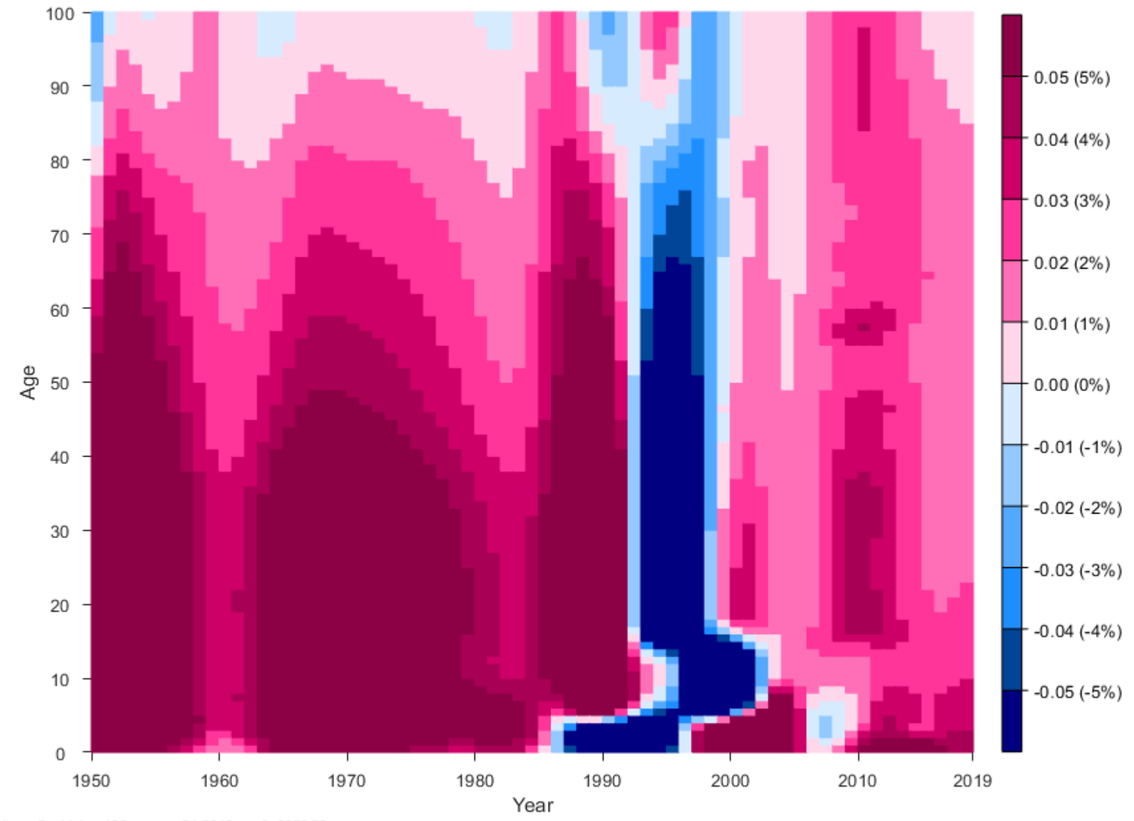
Dem. People's Rep. of Korea

Males



iters=12, nblobs=180, varprc=76.5893, var0=3701.05

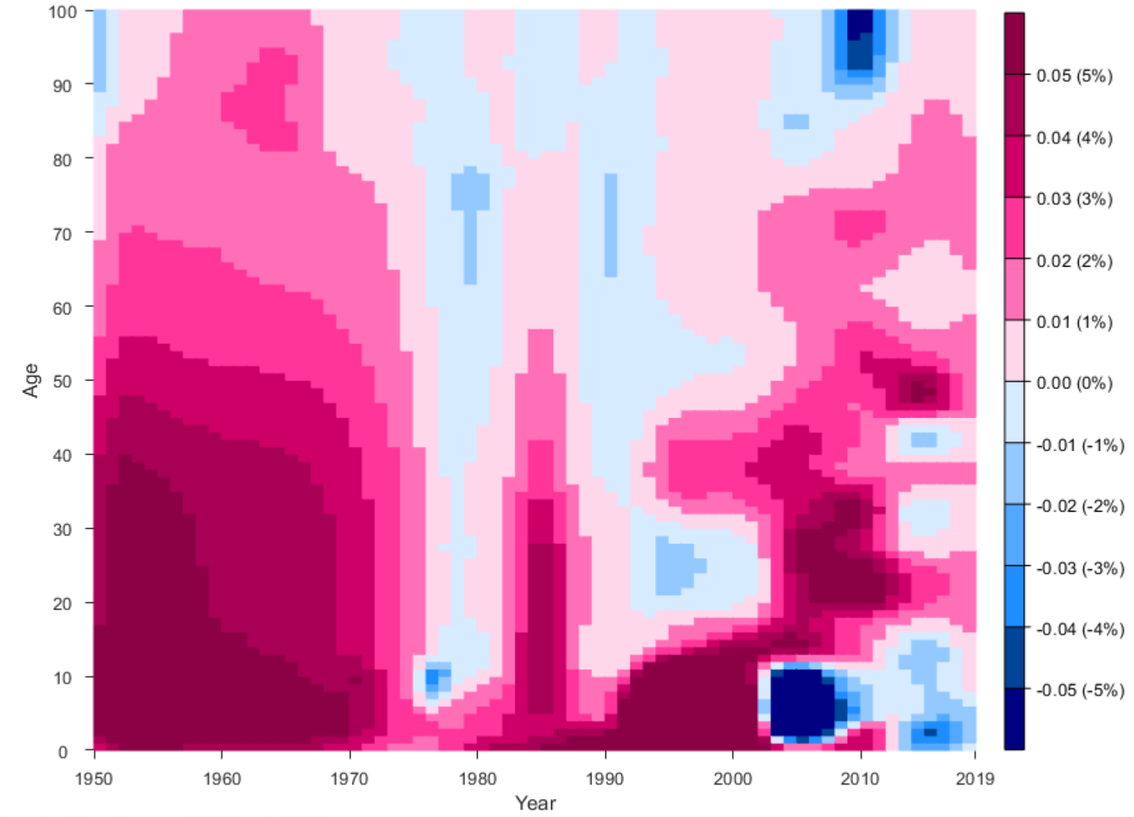
Females



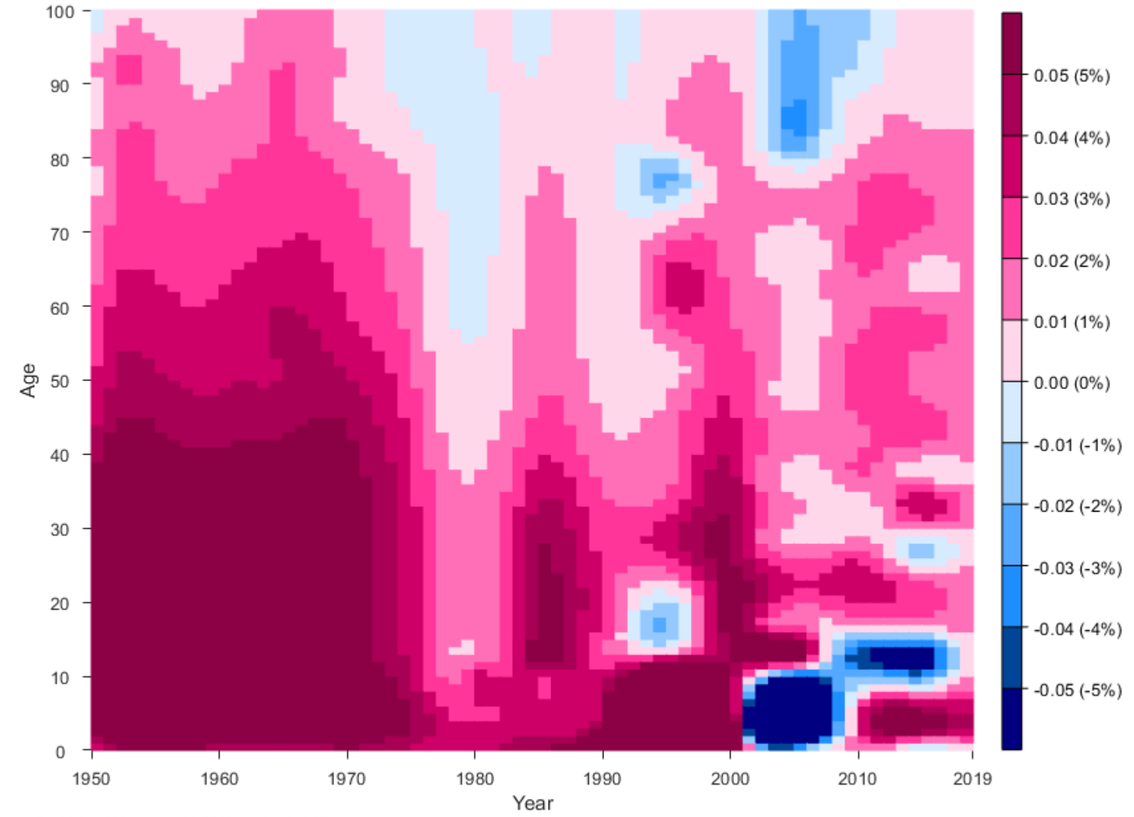
iters=5, nblobs=195, varprc=84.5649, var0=2353.78

North Macedonia

Males

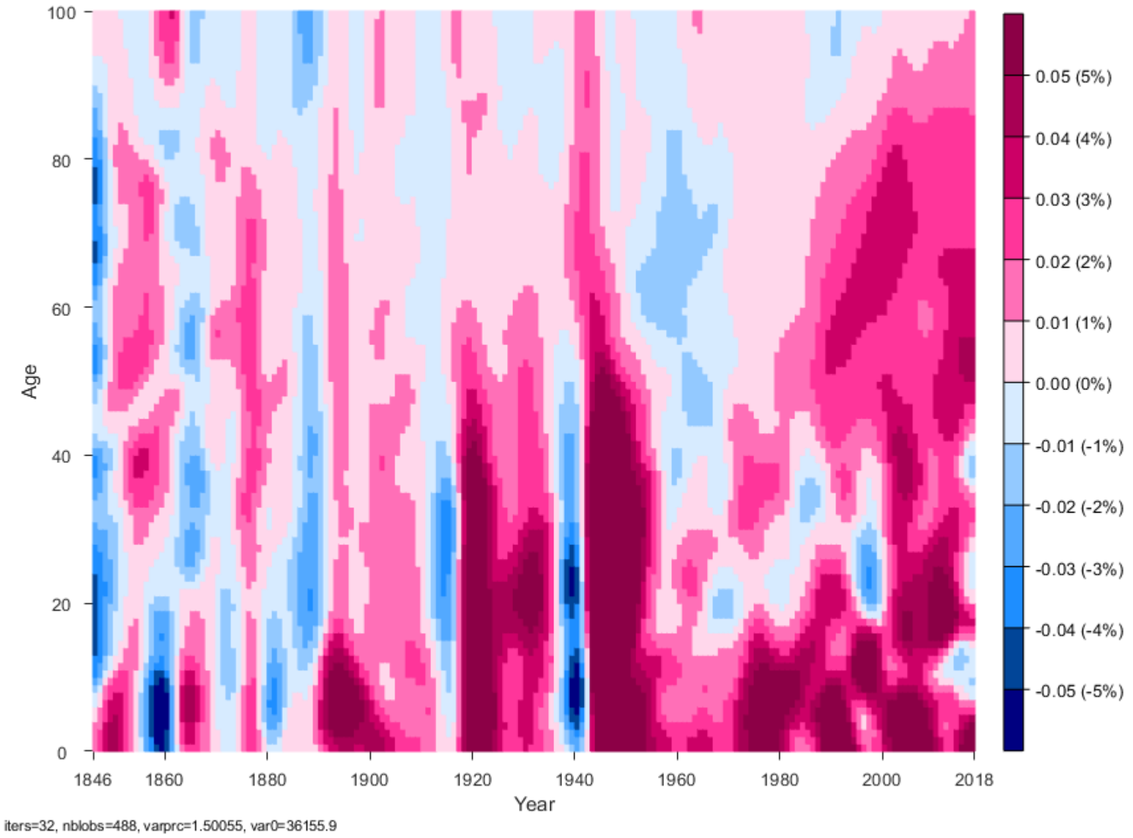


Females



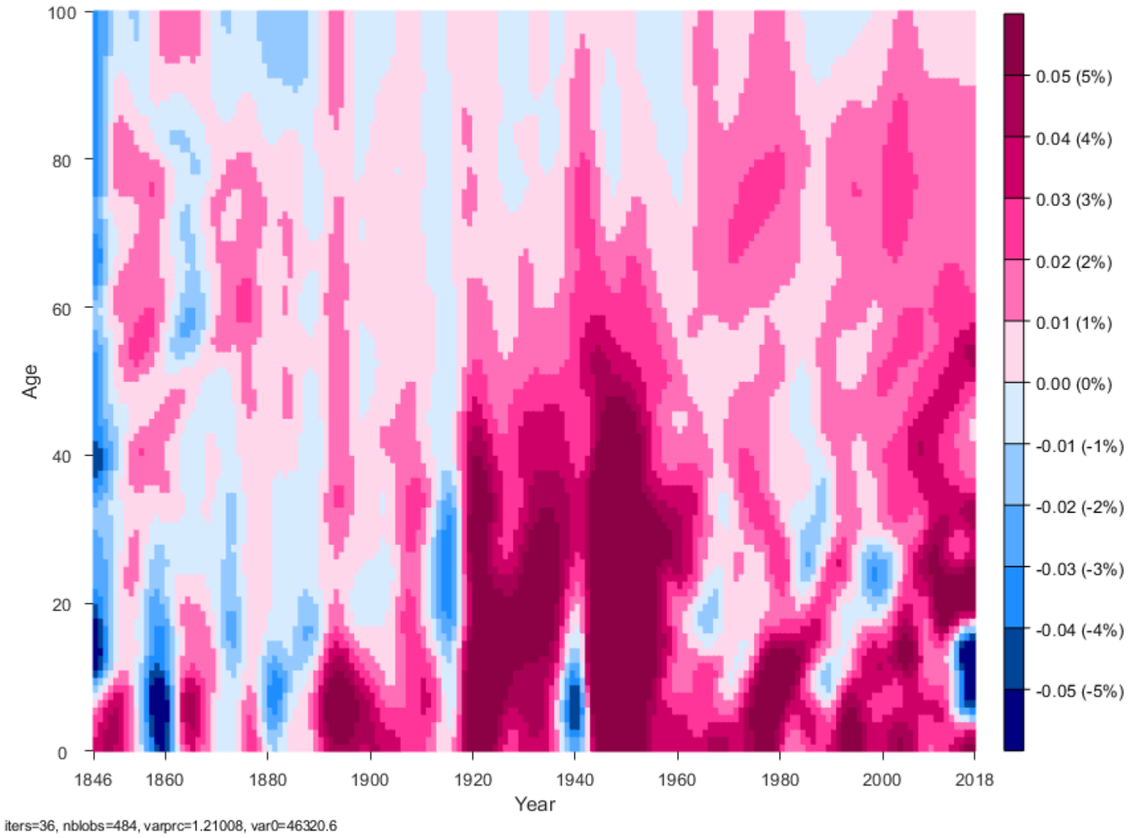
Norway

Males



iters=32, nblobs=488, varprc=1.50055, var0=36155.9

Females

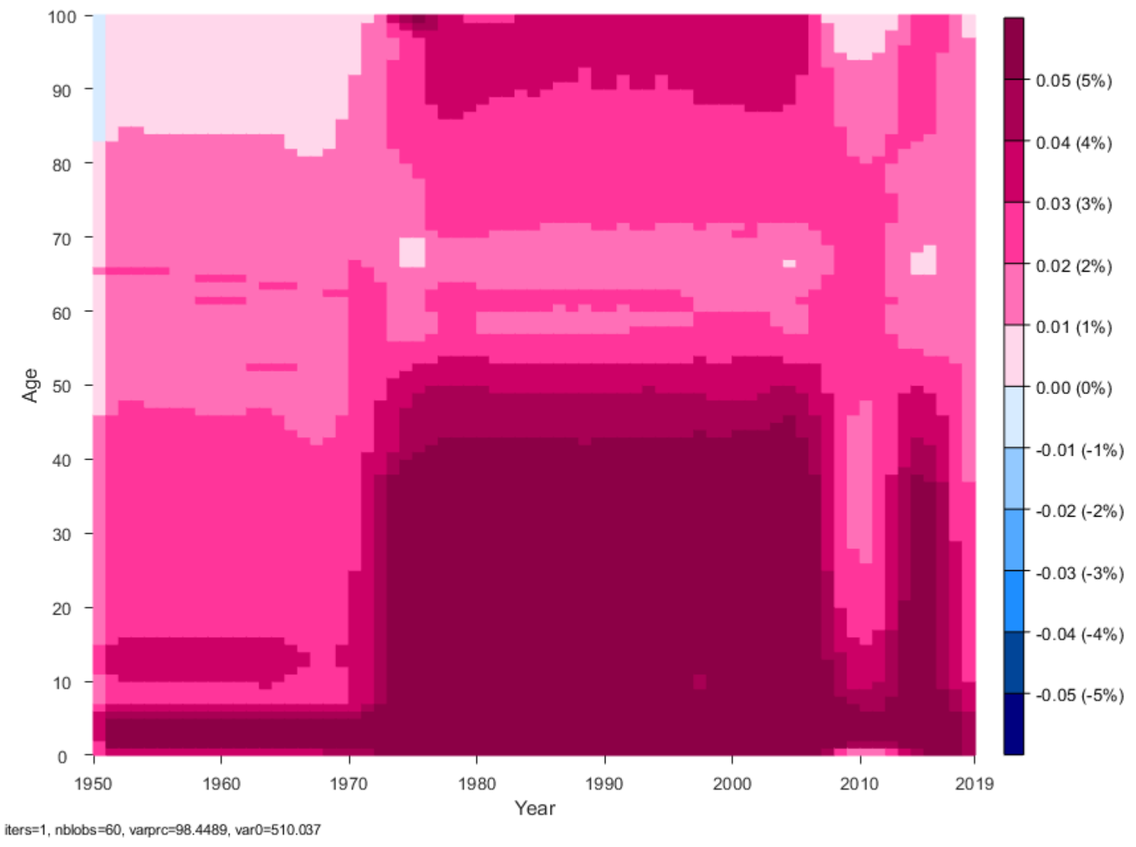


iters=36, nblobs=484, varprc=1.21008, var0=46320.6

Oman

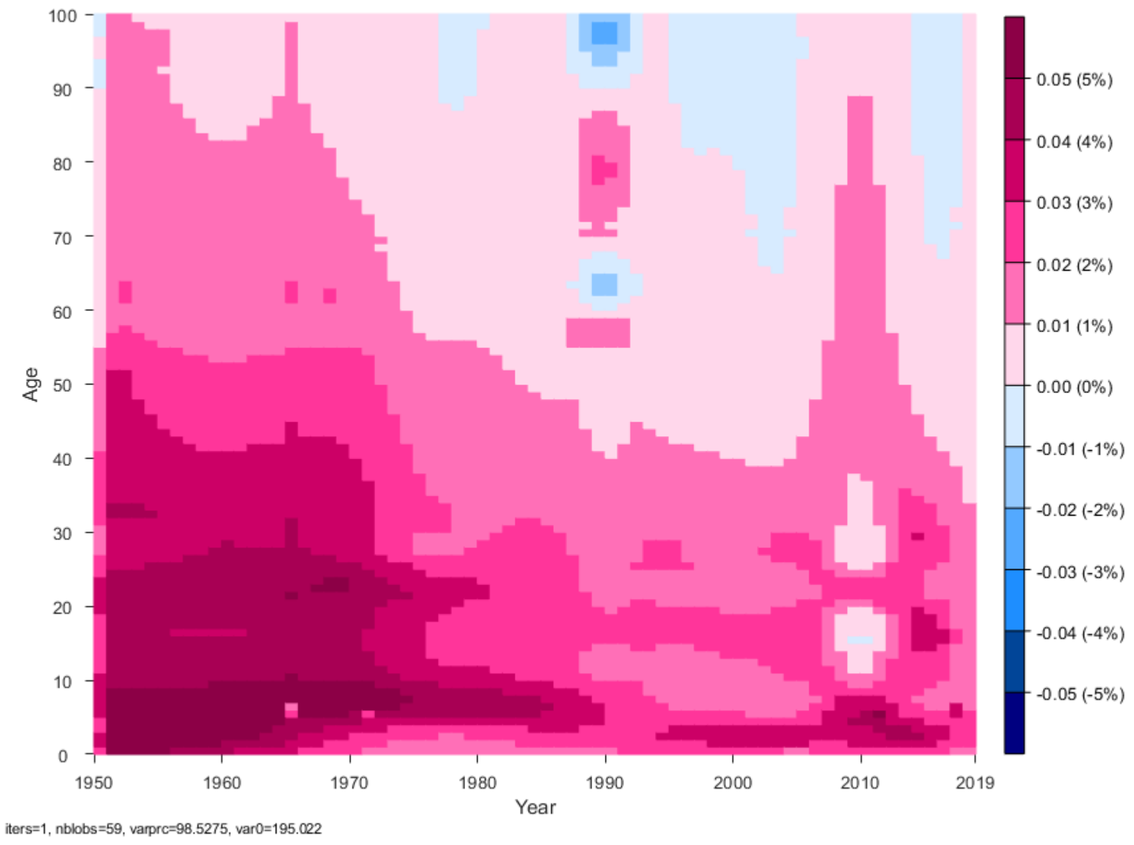
Males

Females

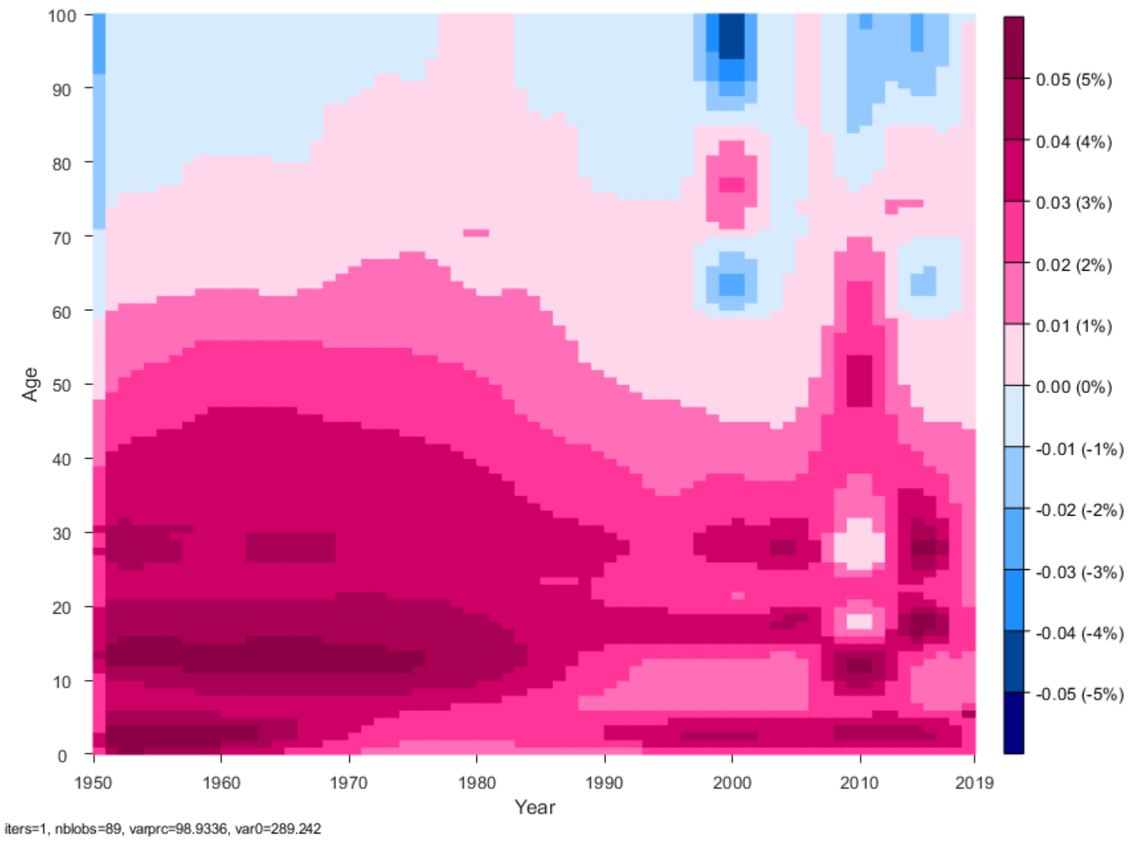


Pakistan

Males

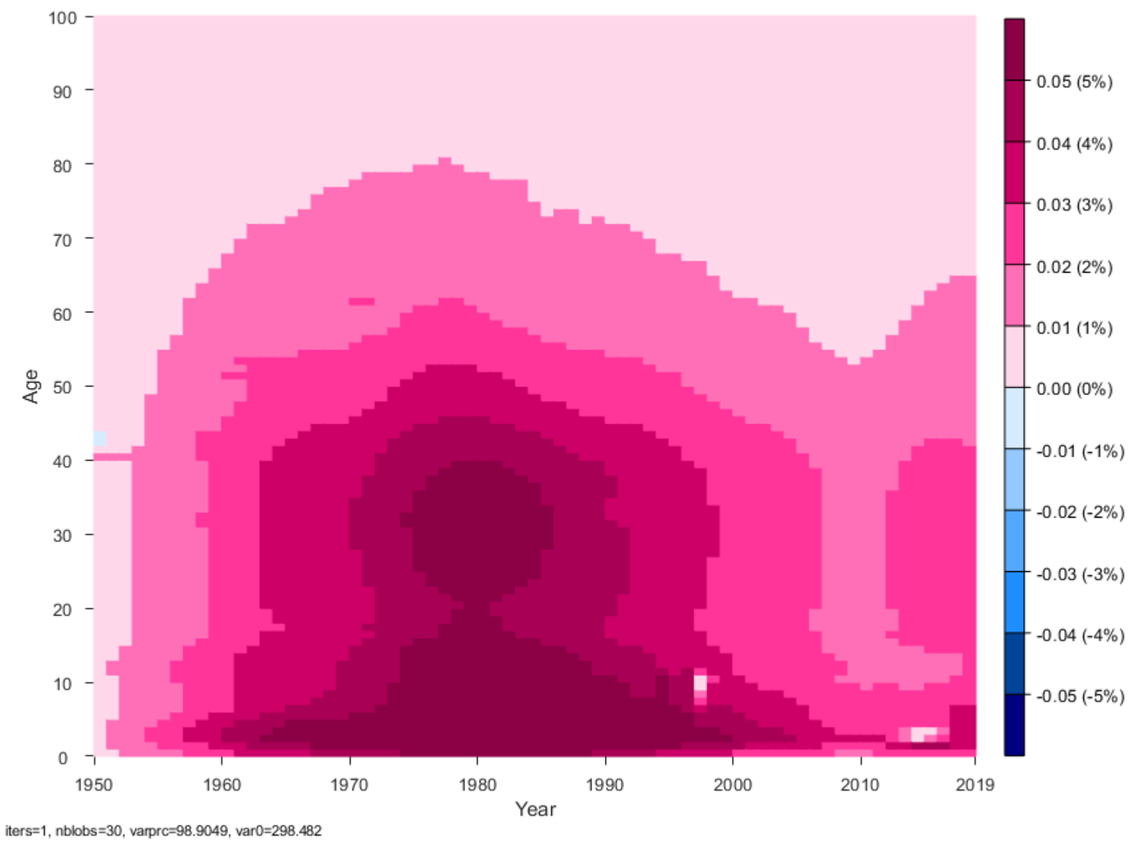


Females



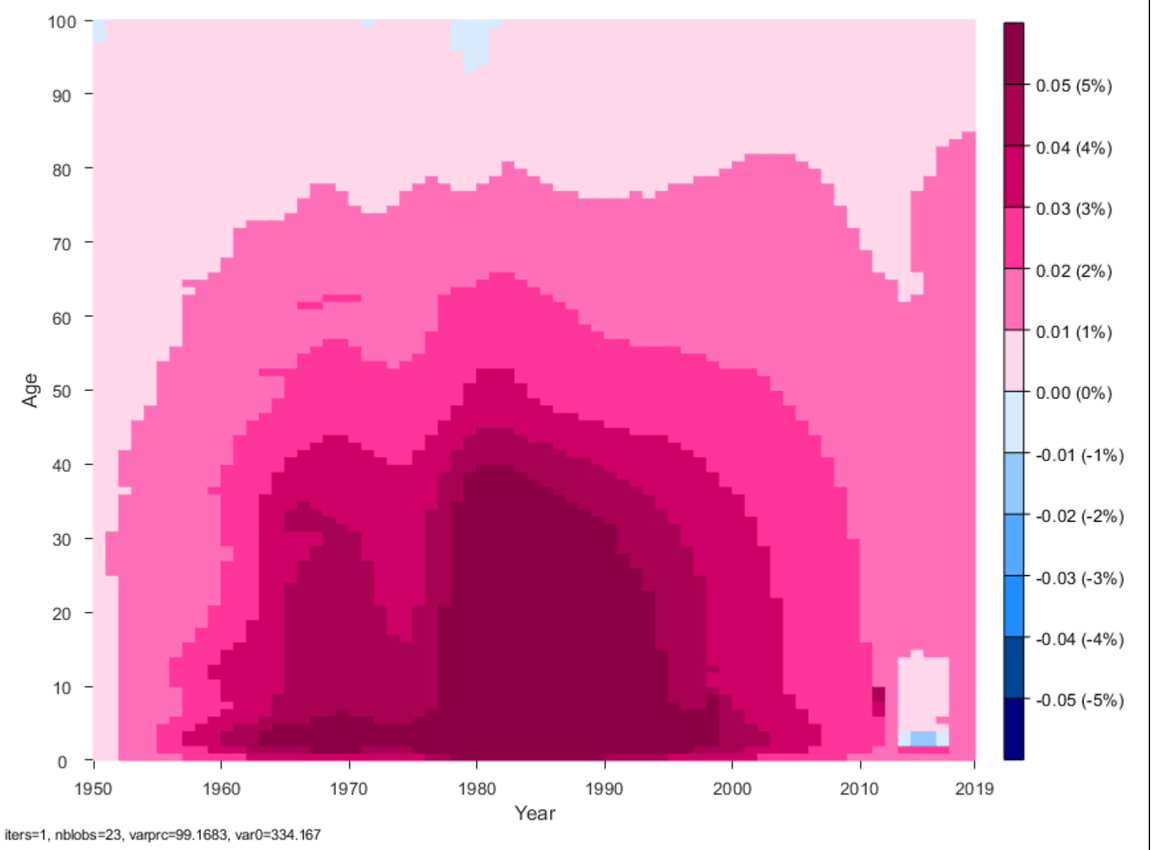
State of Palestine

Males



iters=1, nblobs=30, varprc=98.9049, var0=298.482

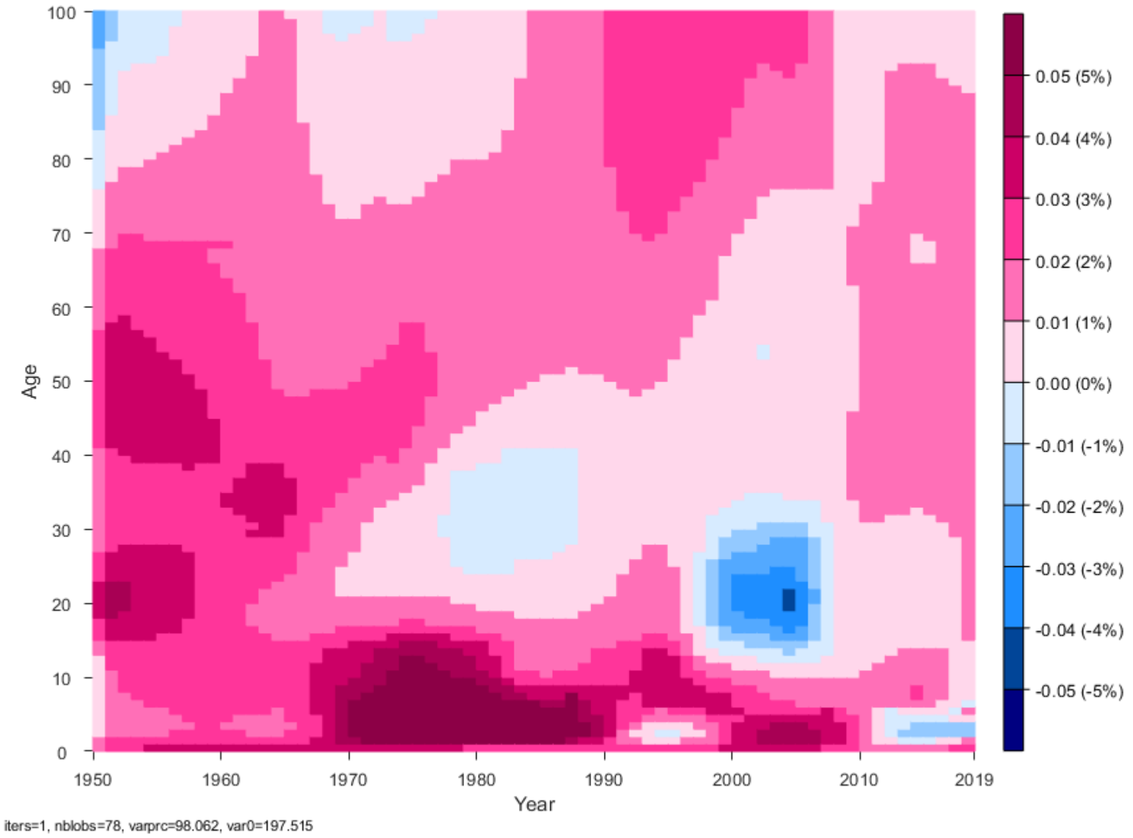
Females



iters=1, nblobs=23, varprc=99.1683, var0=334.167

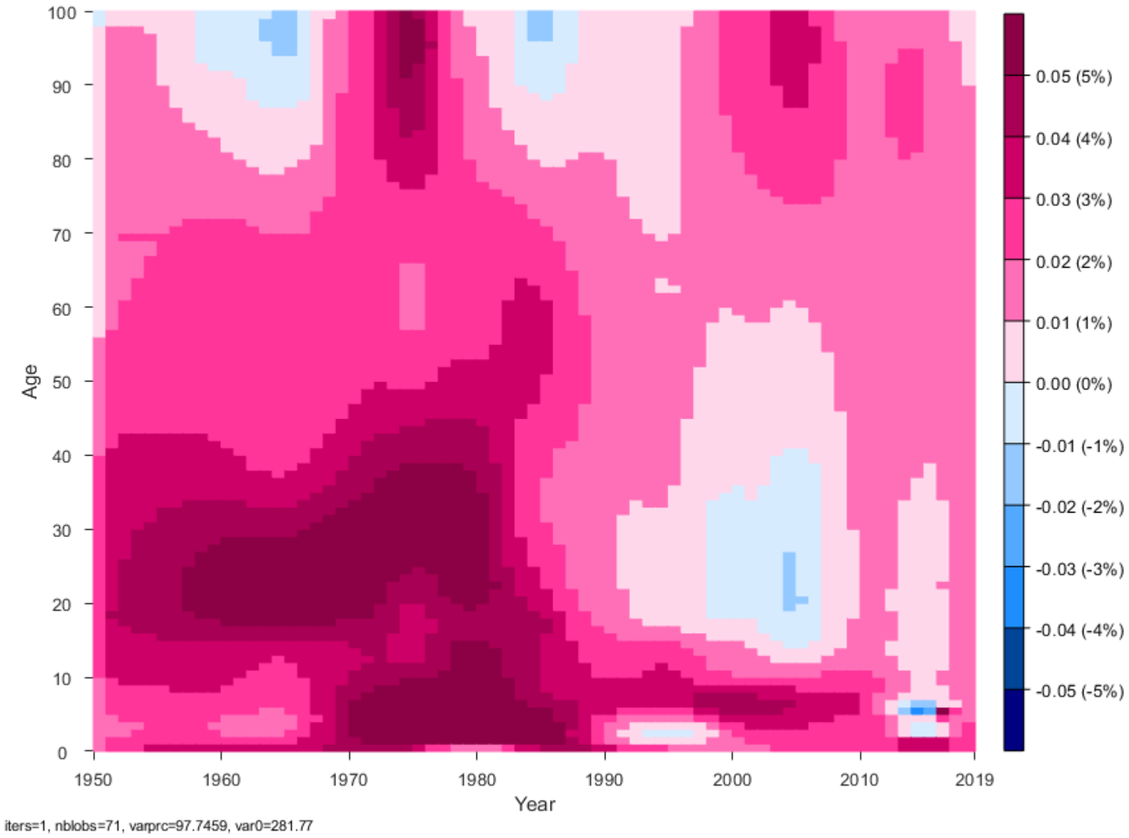
Panama

Males



iters=1, nblobs=78, varprc=98.062, var0=197.515

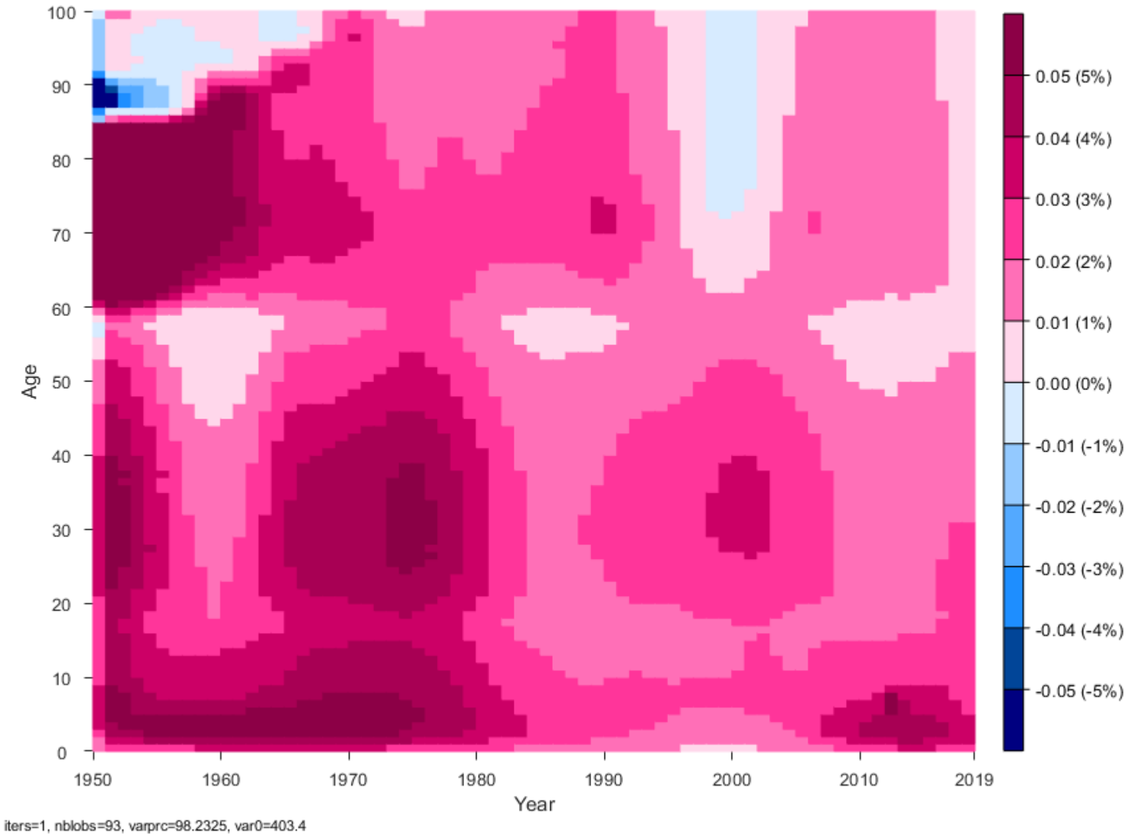
Females



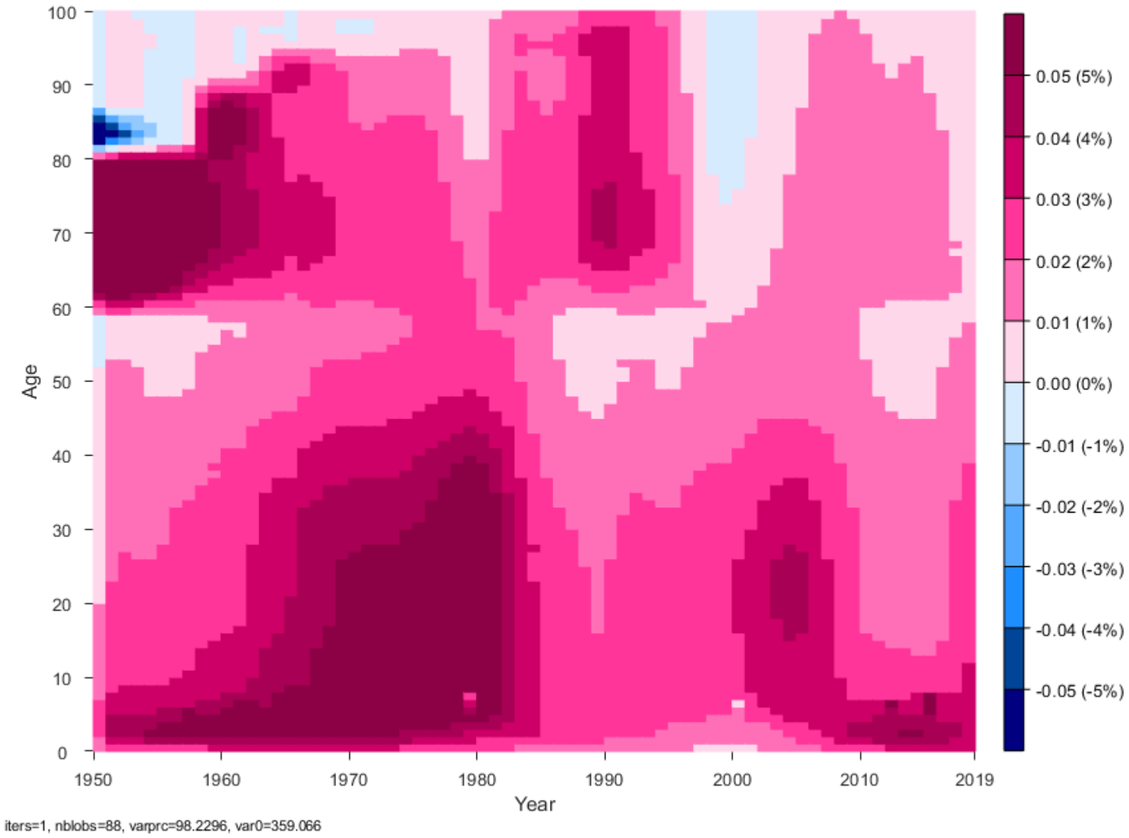
iters=1, nblobs=71, varprc=97.7459, var0=281.77

Papua New Guinea

Males

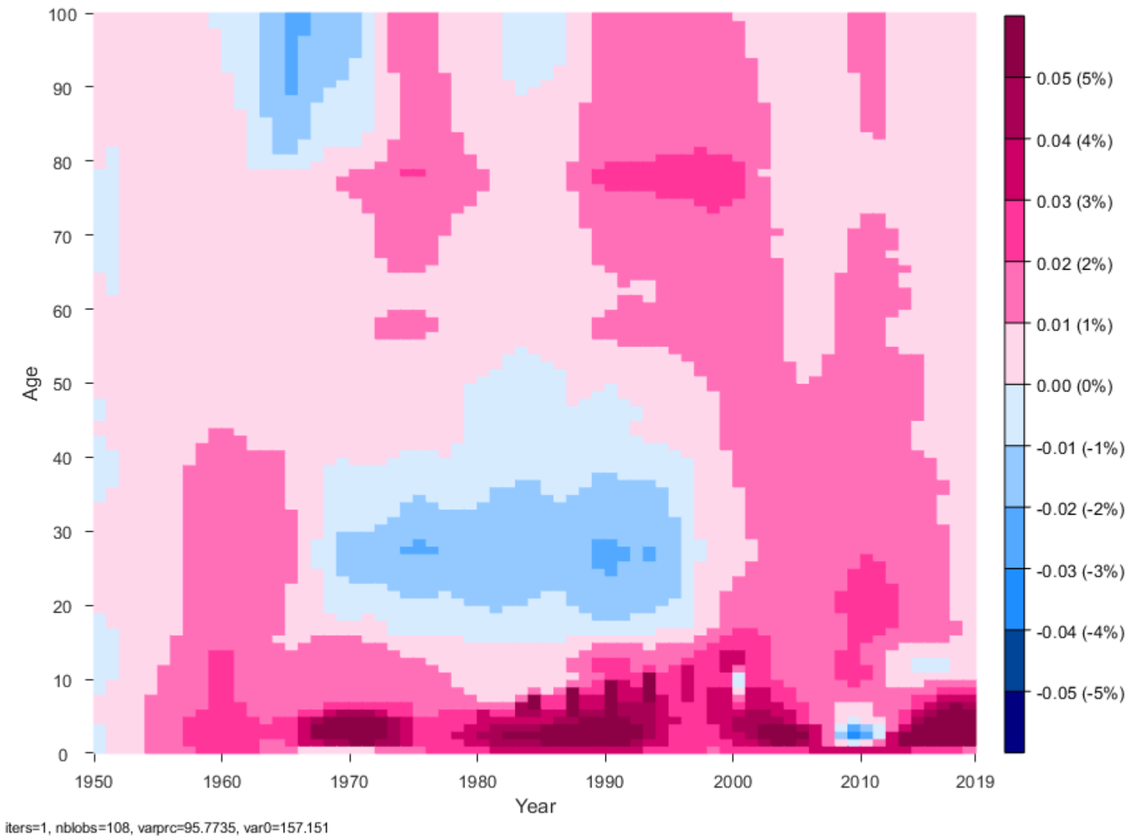


Females

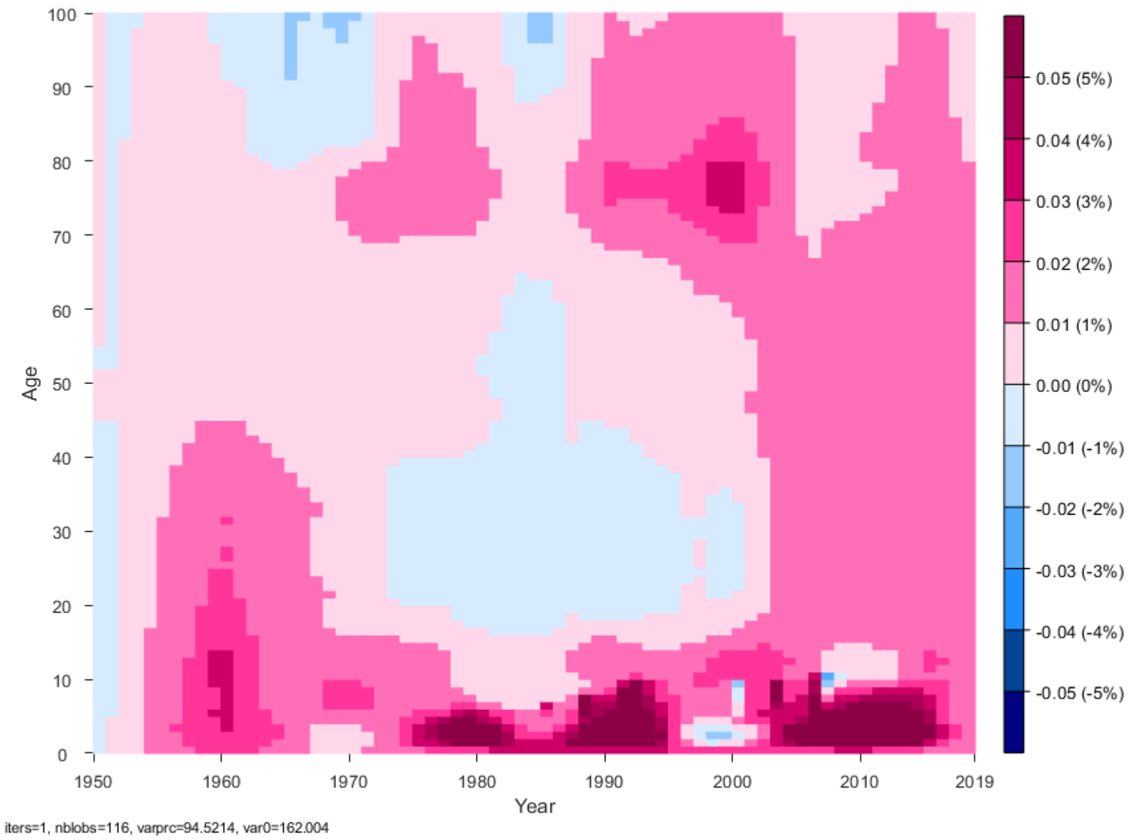


Paraguay

Males

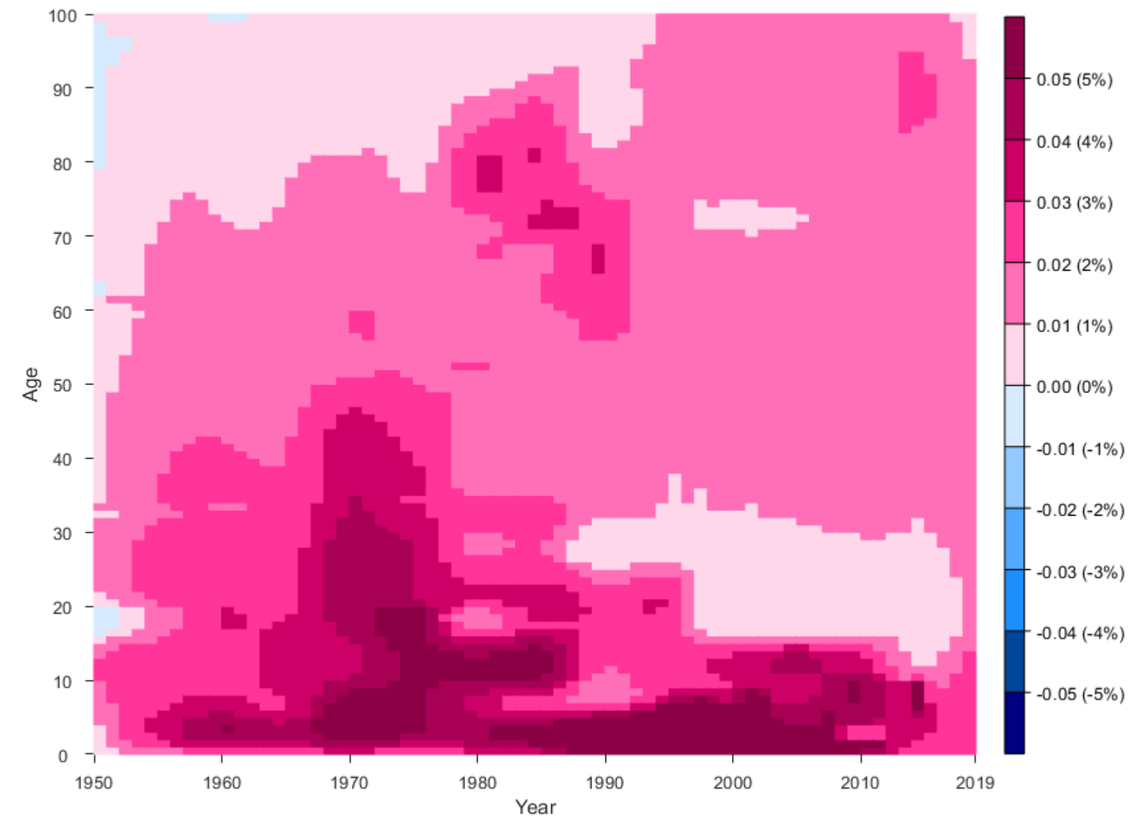


Females



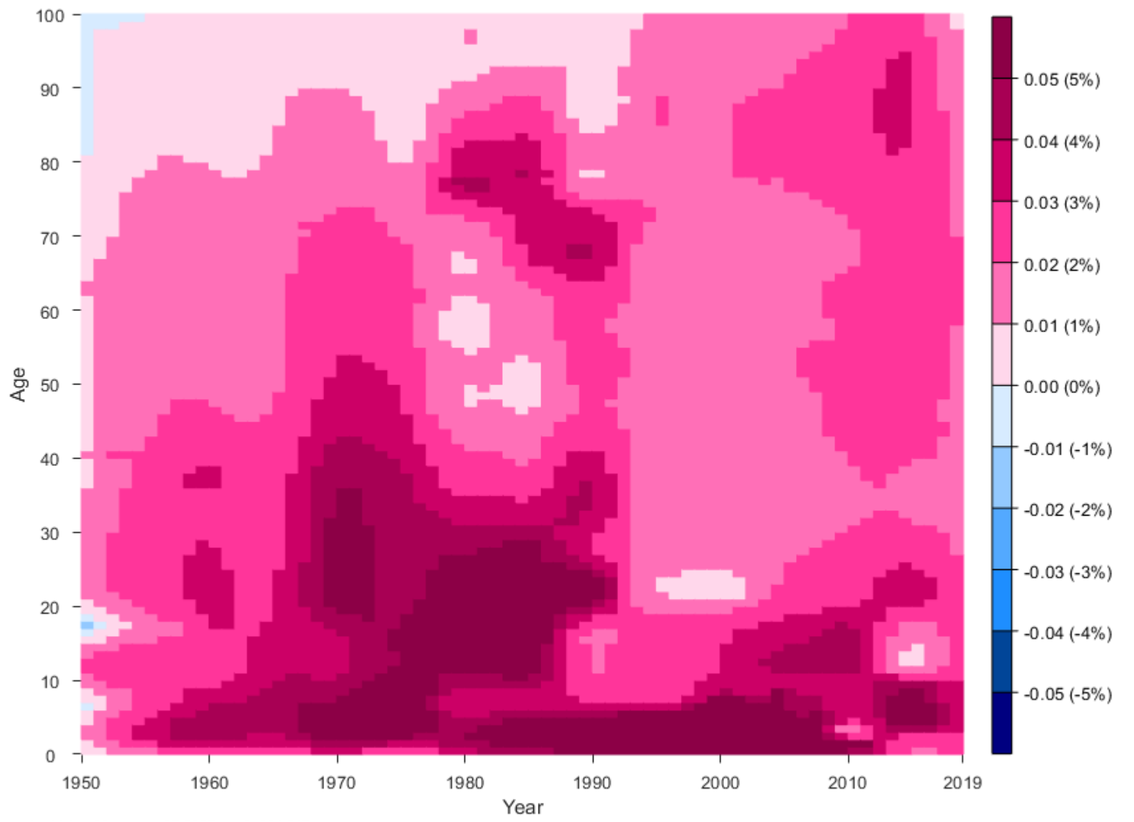
Peru

Males



iters=1, nblobs=76, varprc=96.3009, var0=204.293

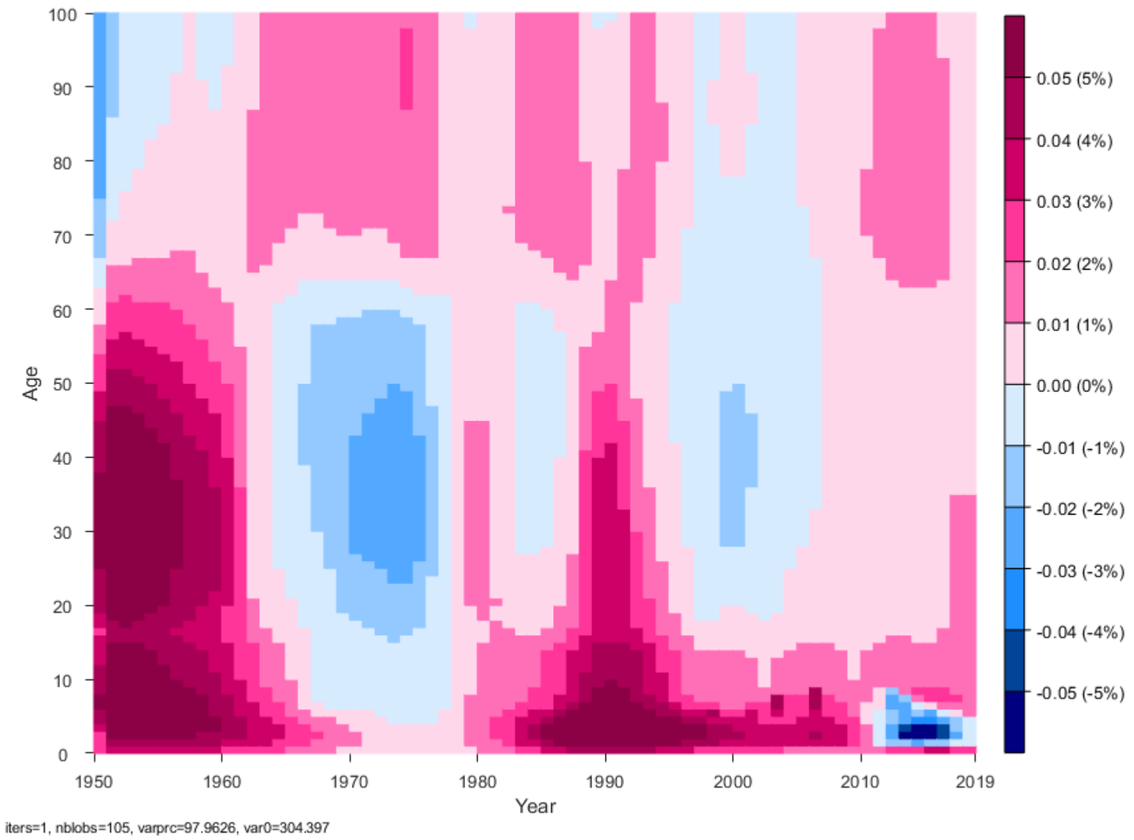
Females



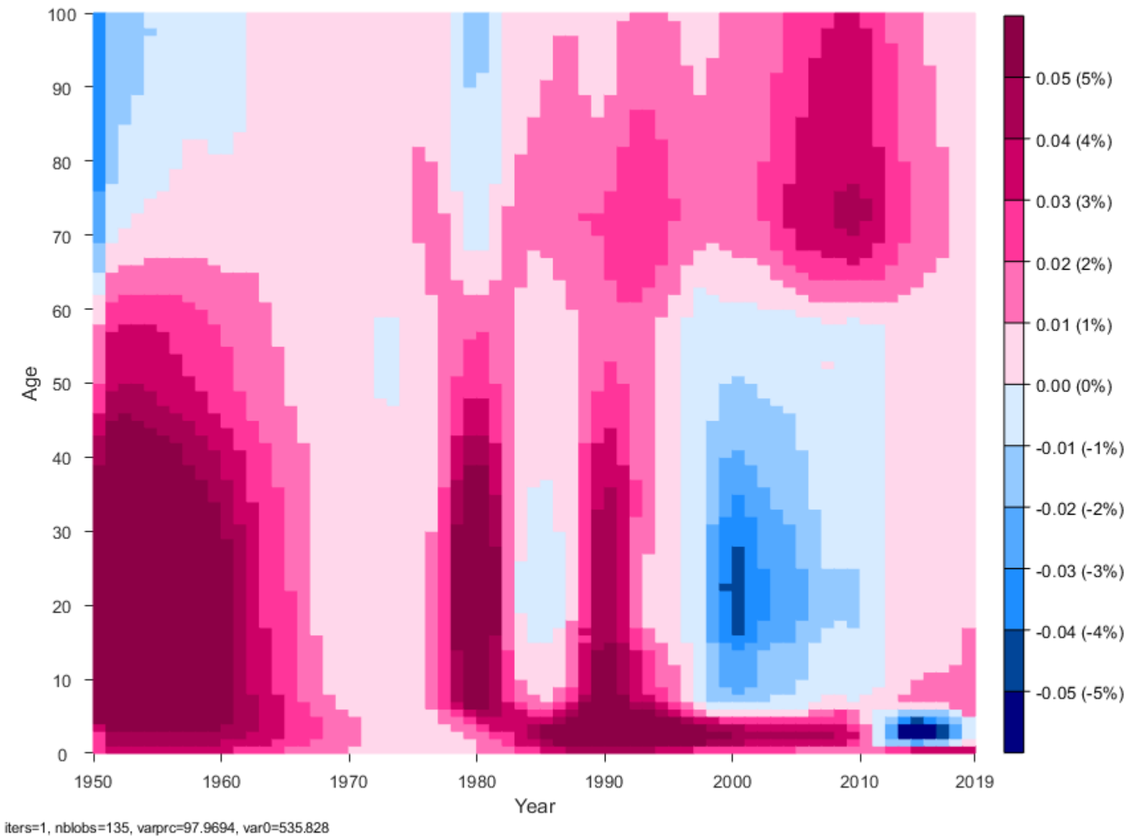
iters=1, nblobs=80, varprc=97.5067, var0=234.247

Philippines

Males

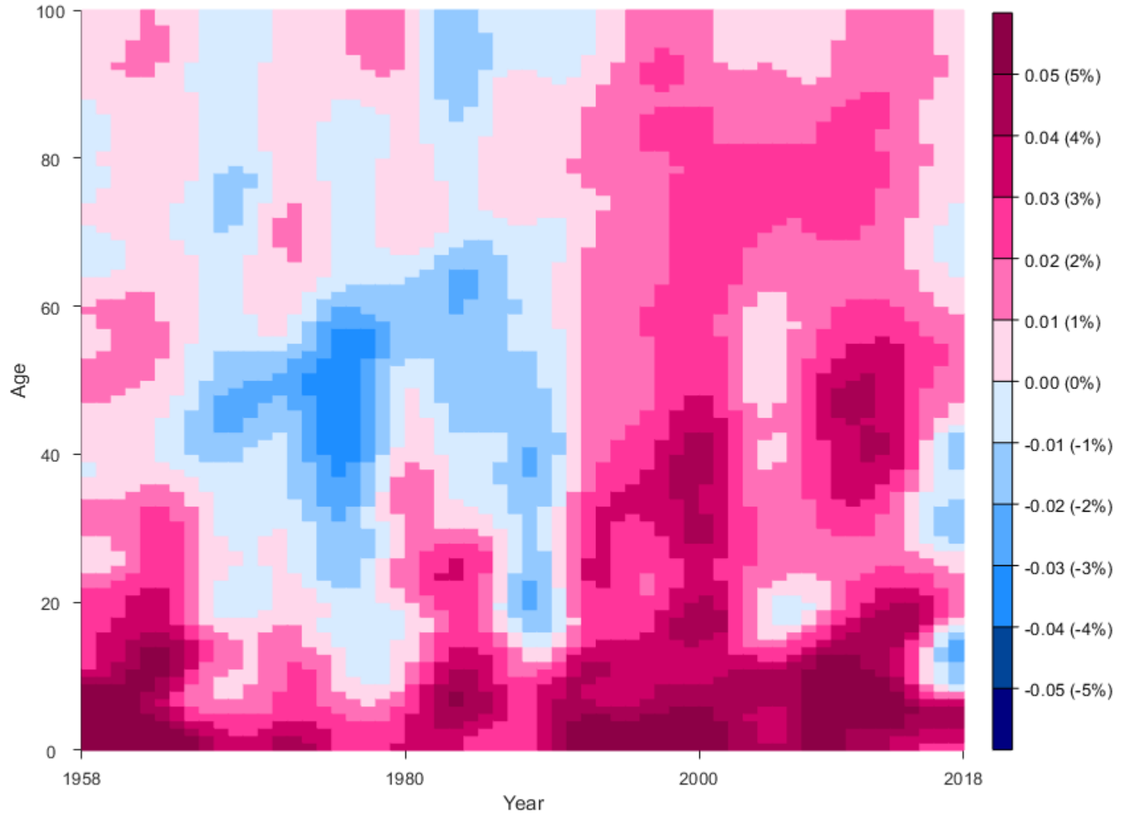


Females



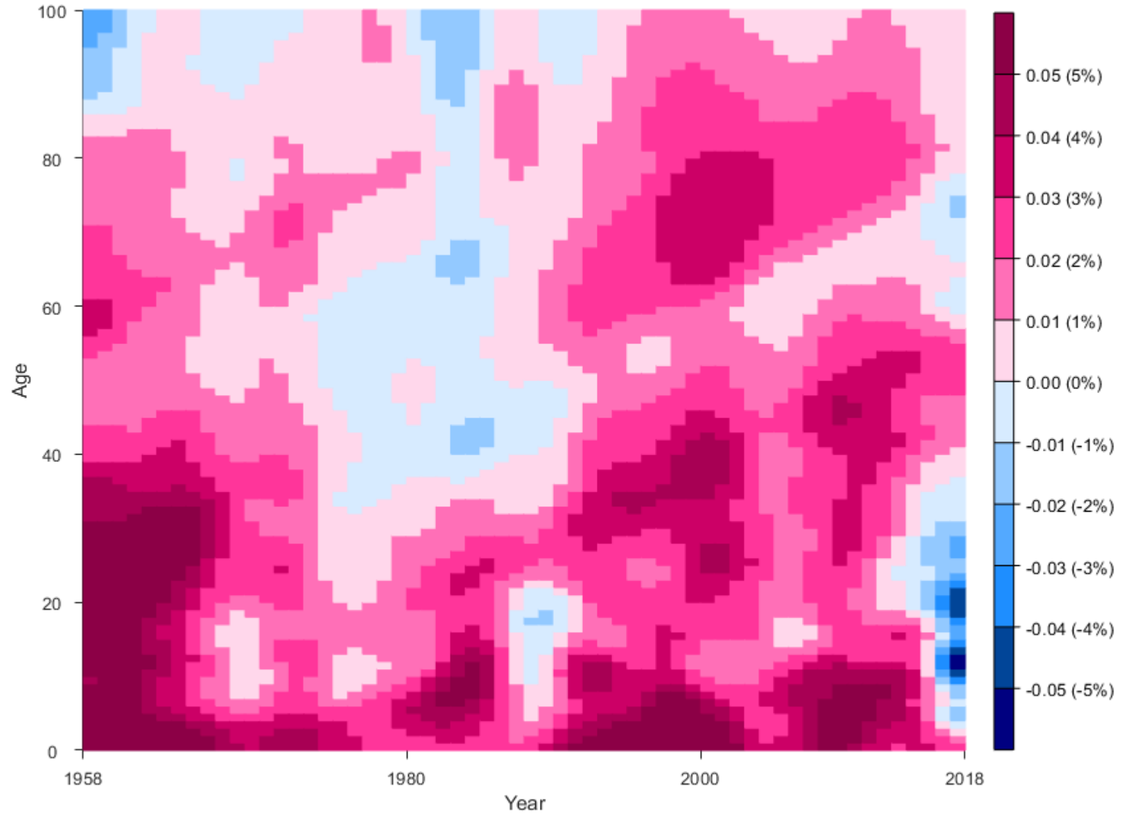
Poland

Males



iters=22, nblobs=149, varprc=3.73488, var0=8860.74

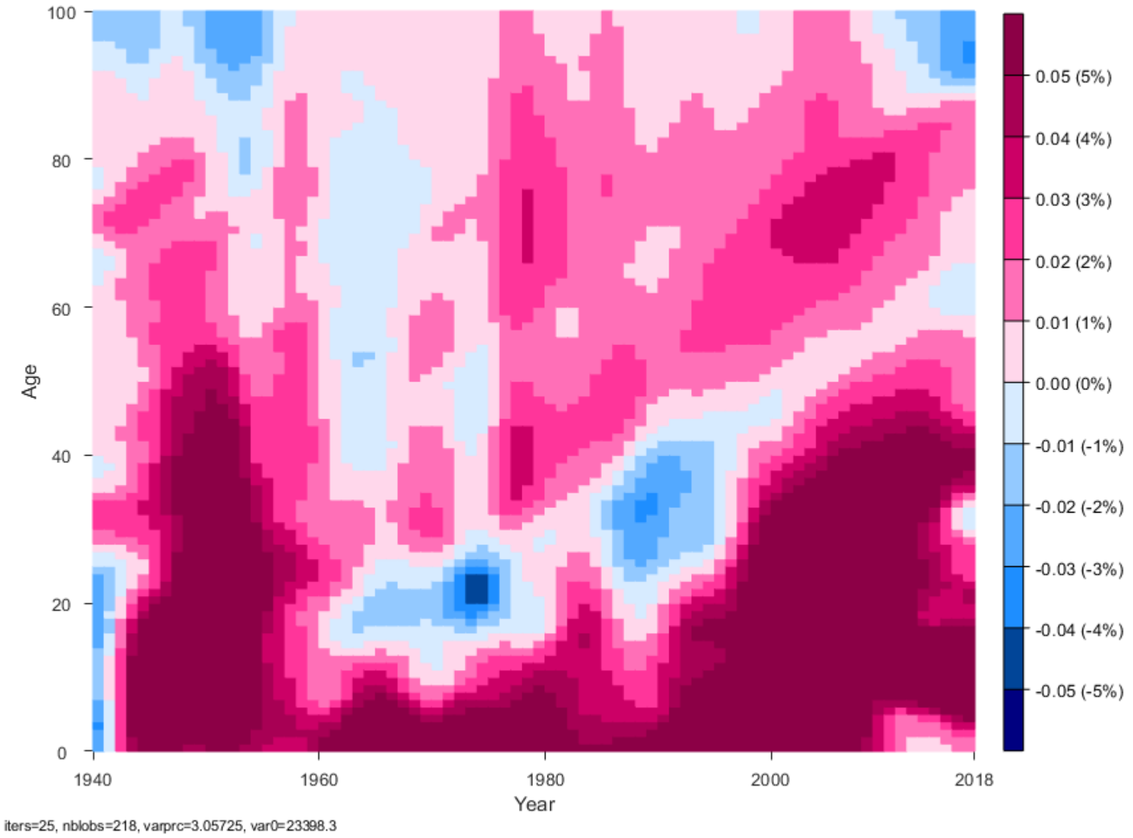
Females



iters=22, nblobs=155, varprc=2.07779, var0=13181.3

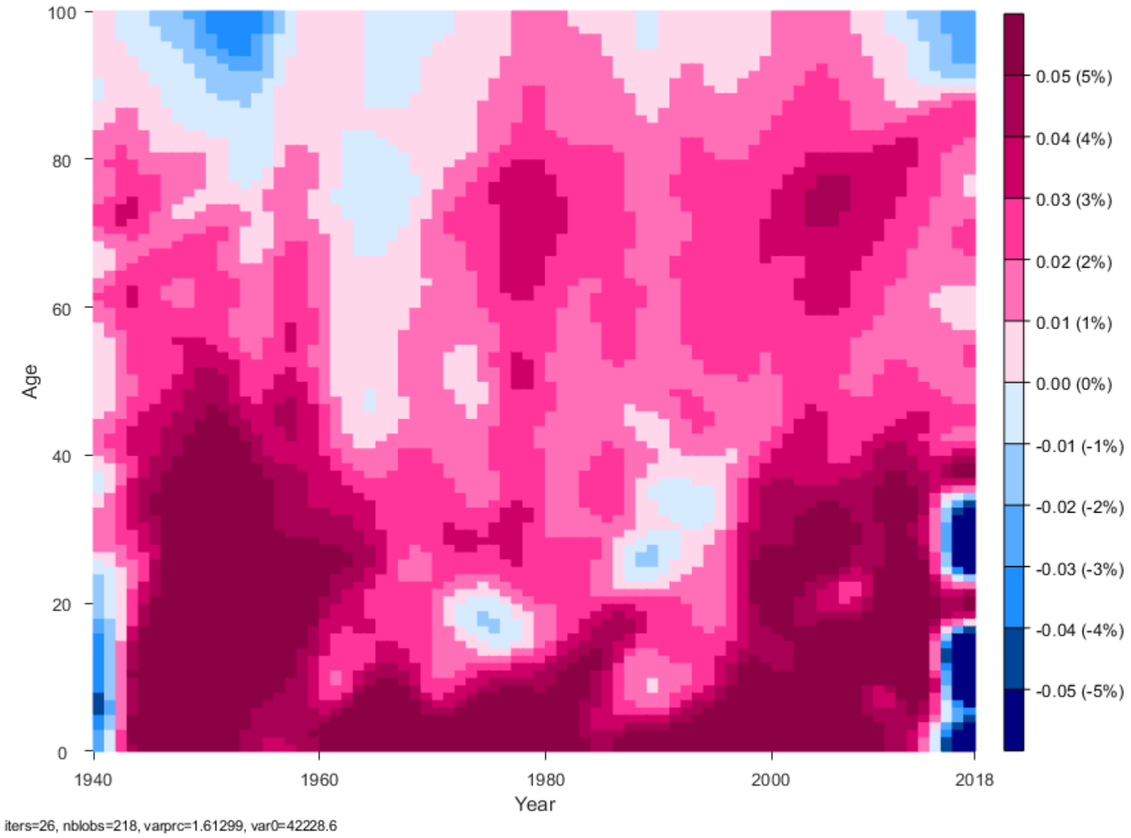
Portugal

Males



iters=25, nblobs=218, varprc=3.05725, var0=23398.3

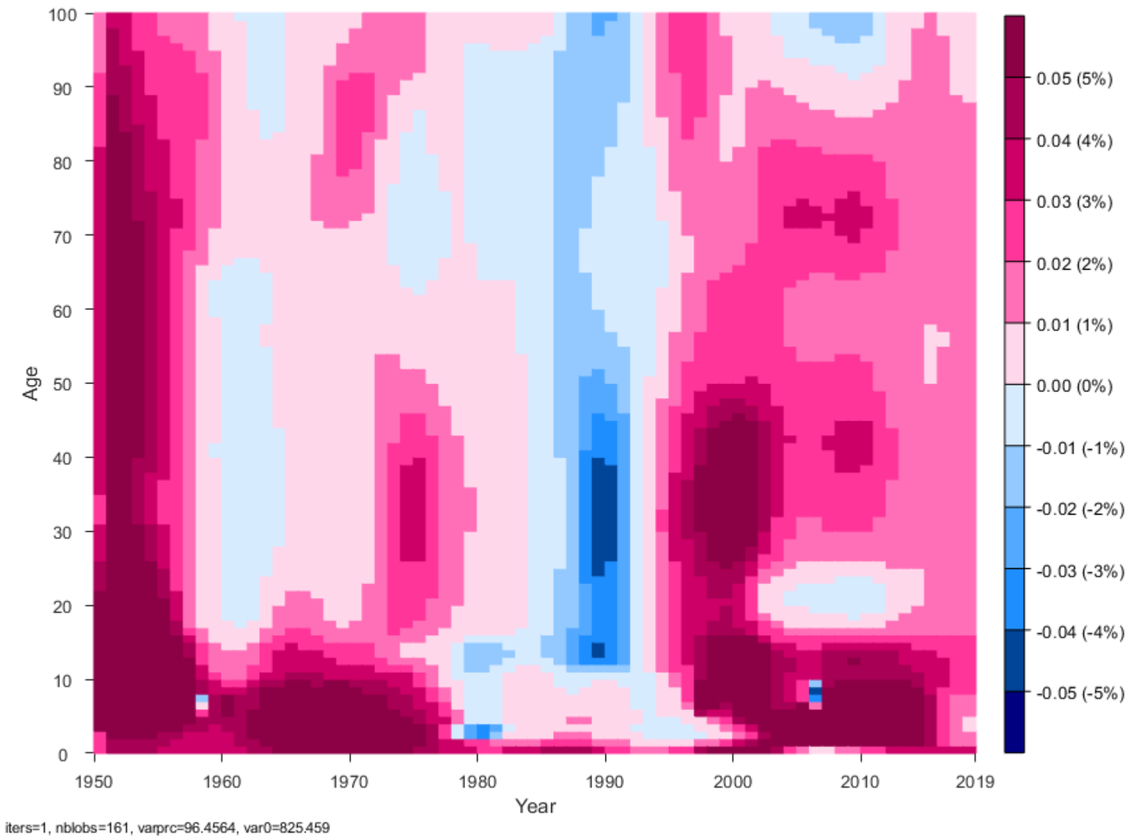
Females



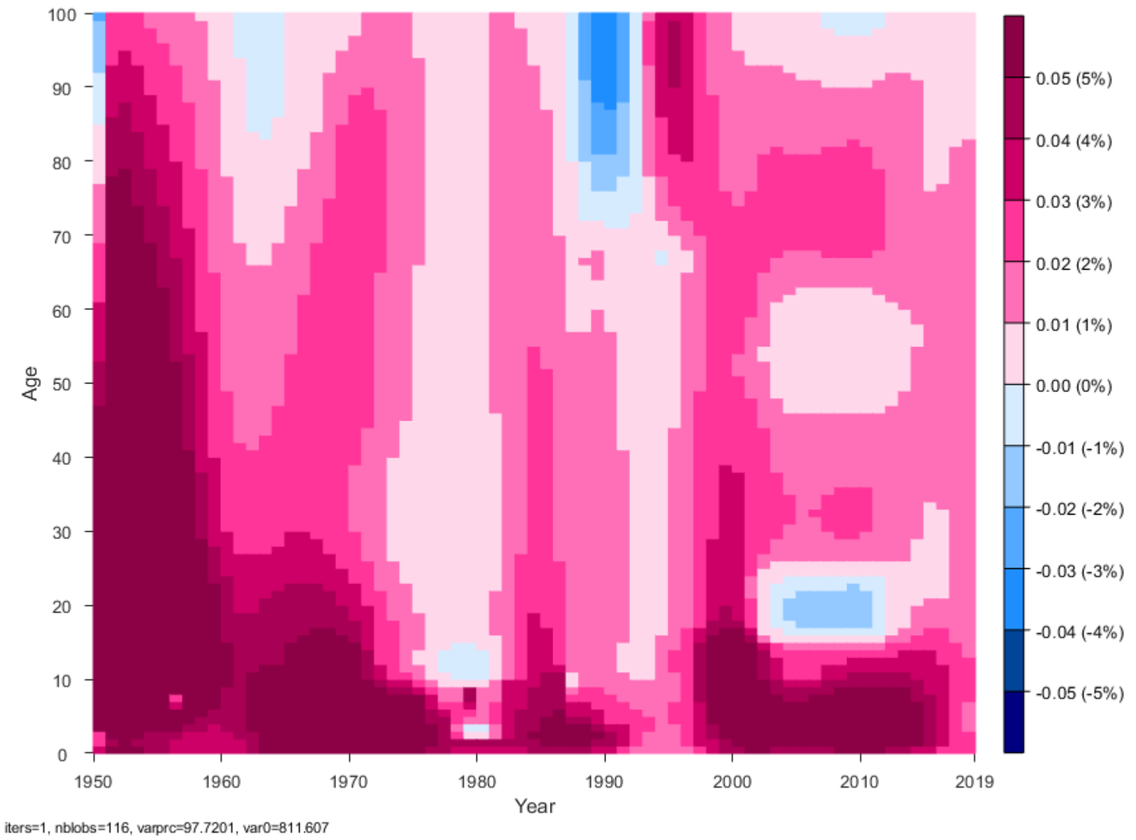
iters=26, nblobs=218, varprc=1.61299, var0=42228.6

Puerto Rico

Males

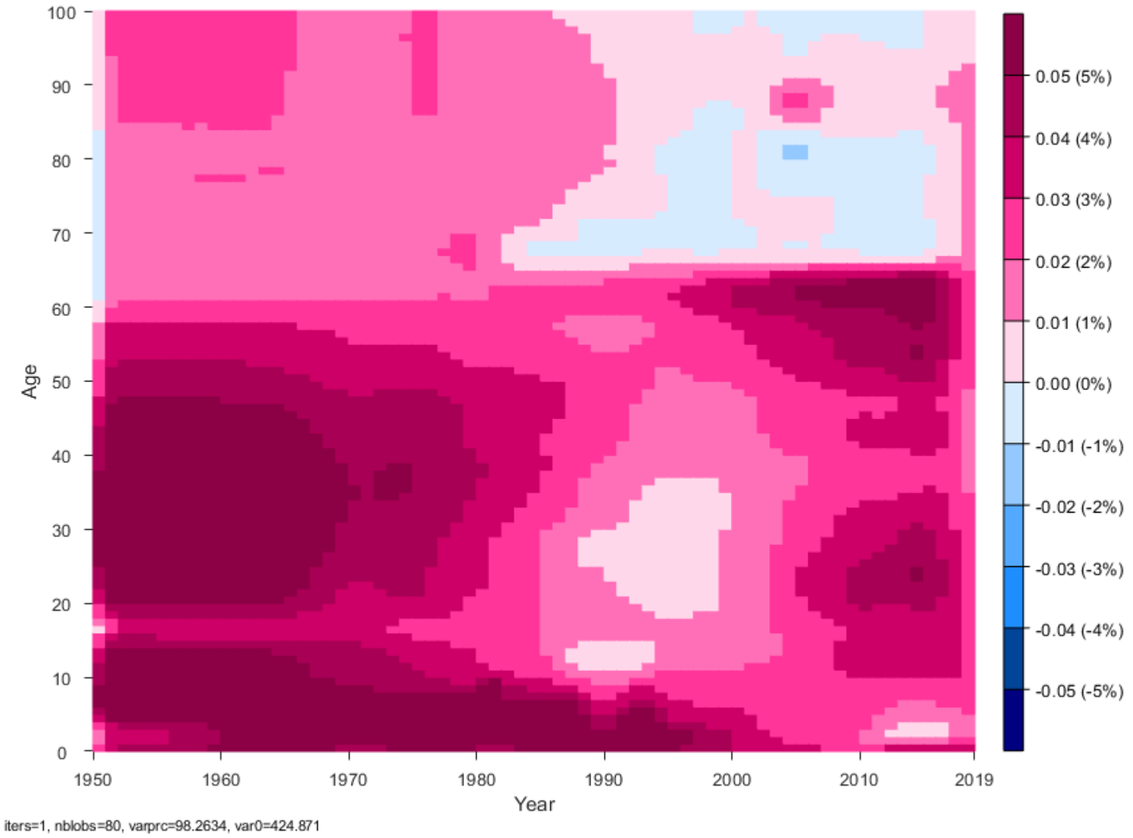


Females



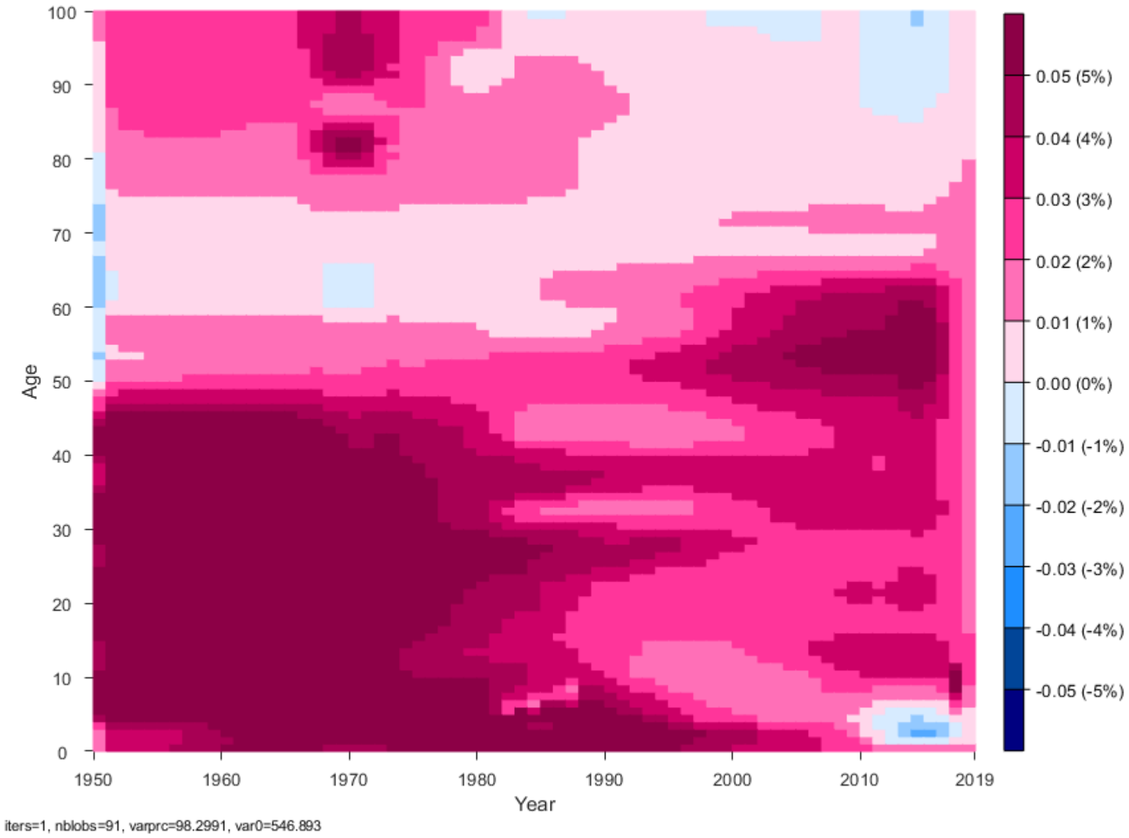
Qatar

Males



iters=1, nblobs=80, varprc=98.2634, var0=424.871

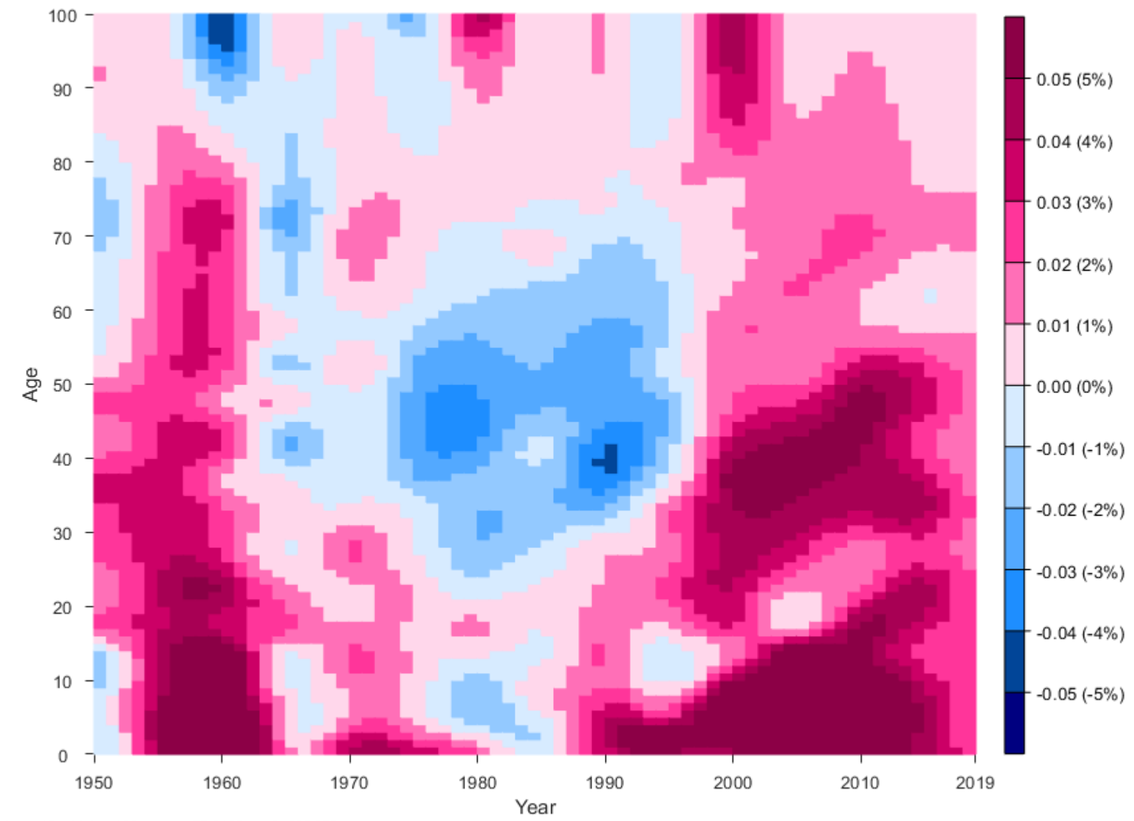
Females



iters=1, nblobs=91, varprc=98.2991, var0=546.893

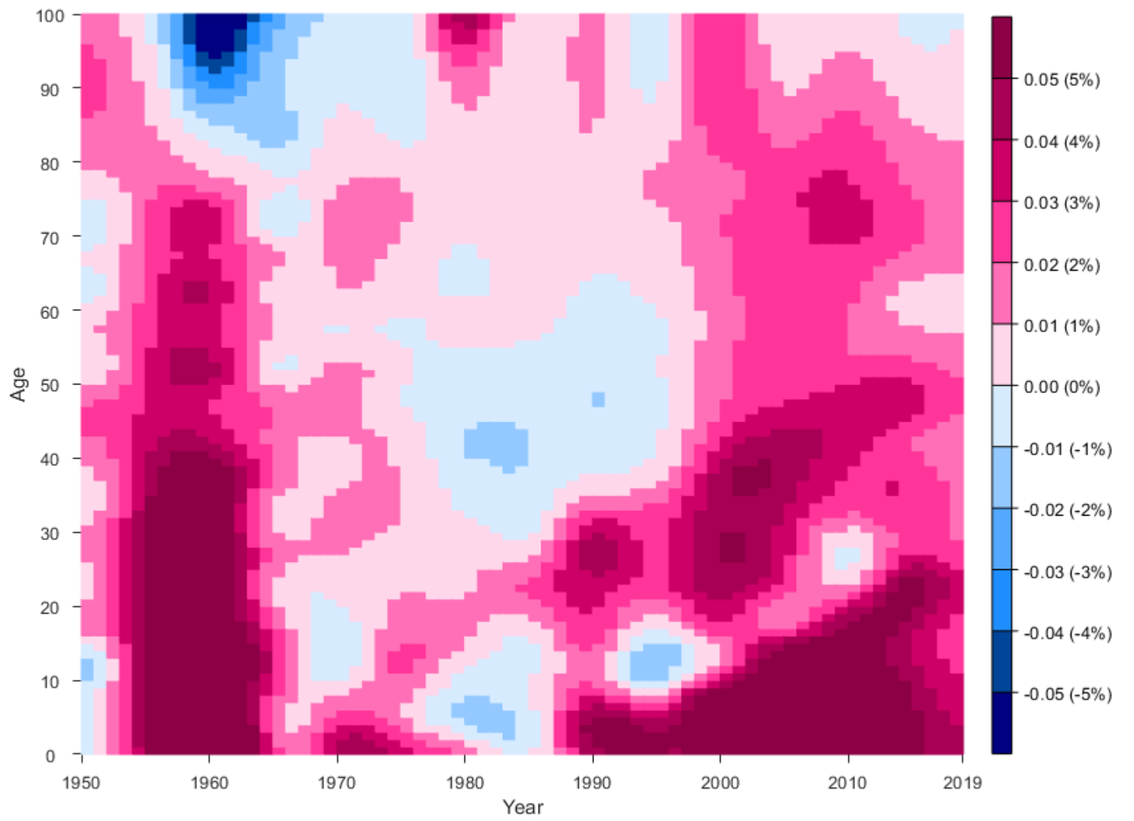
Romania

Males



iters=13, nblobs=182, varprc=77.9103, var0=632.359

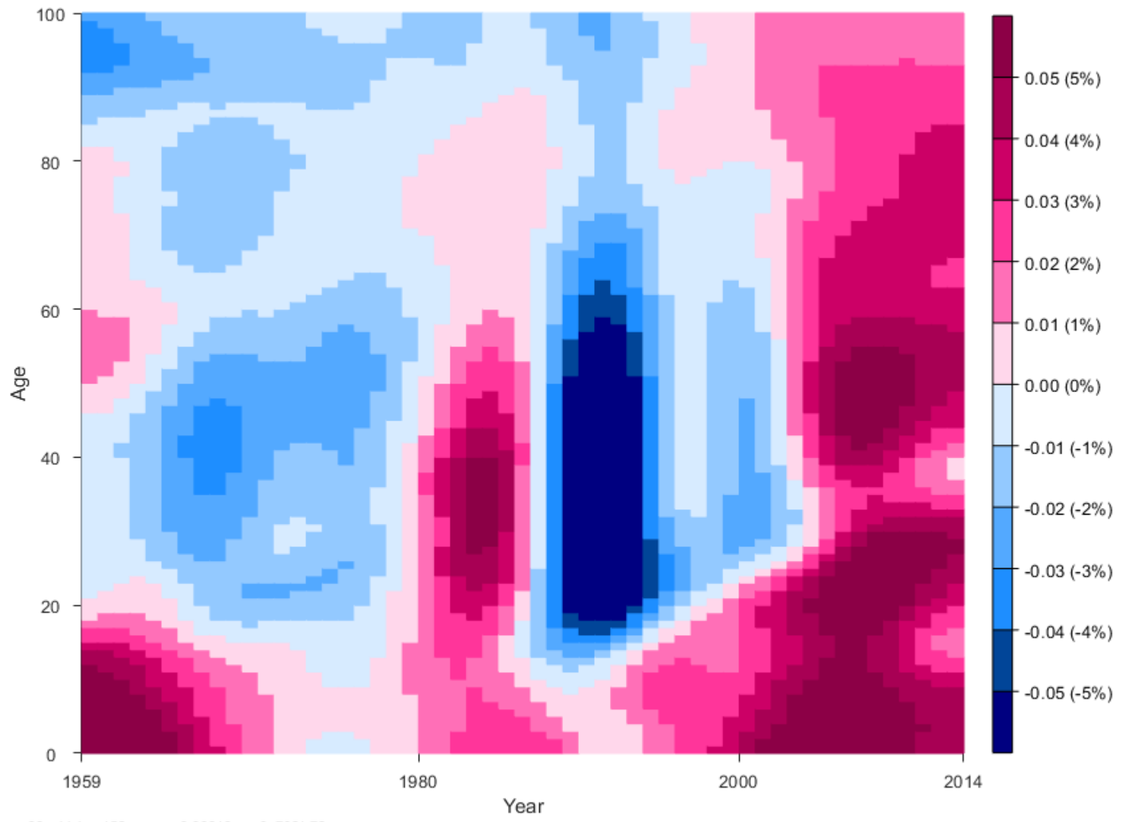
Females



iters=20, nblobs=185, varprc=66.2912, var0=705.084

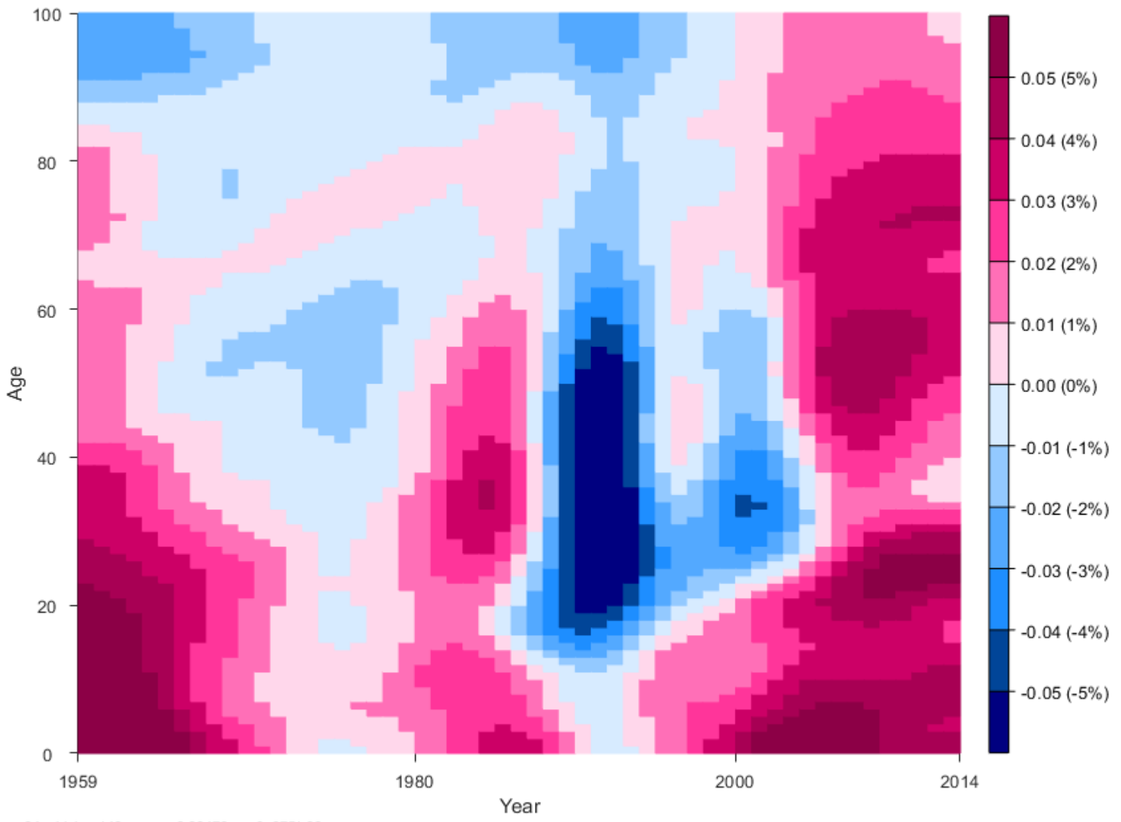
Russian Federation

Males



iters=38, nblobs=152, varprc=9.96618, var0=7021.72

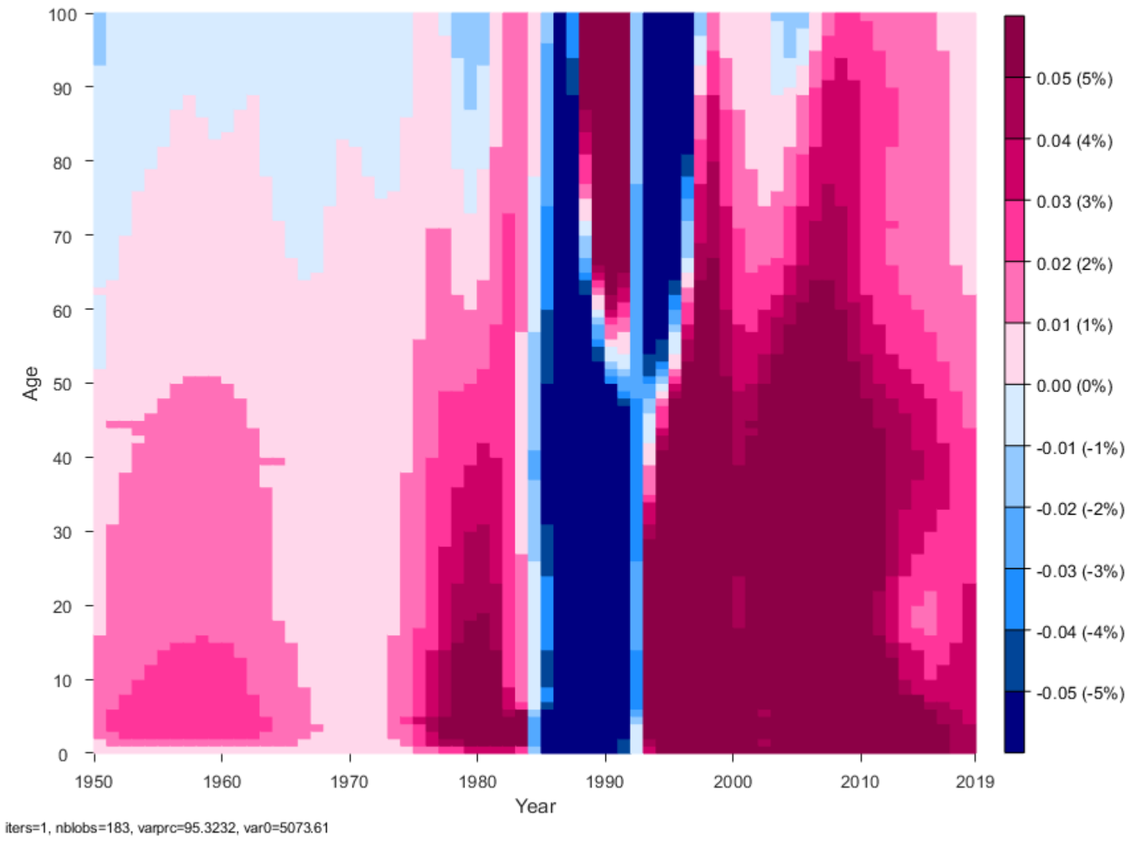
Females



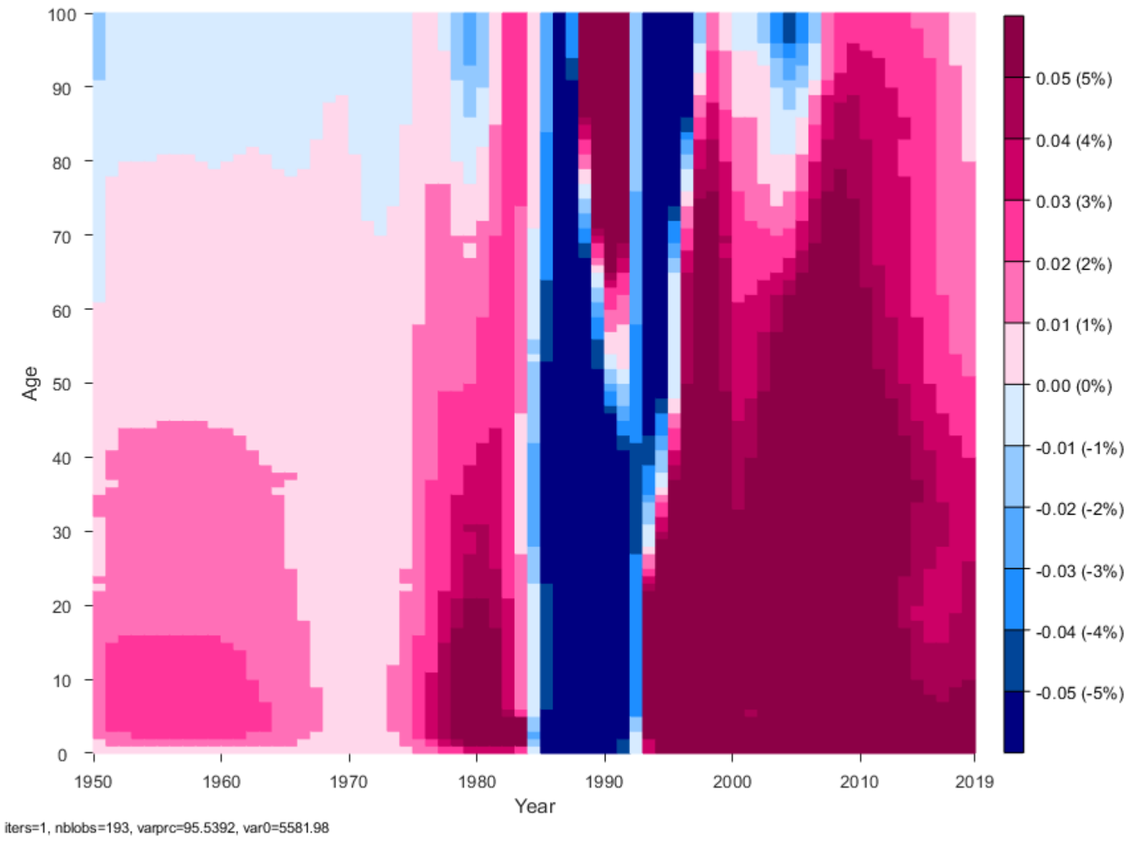
iters=34, nblobs=149, varprc=8.33478, var0=6751.38

Rwanda

Males

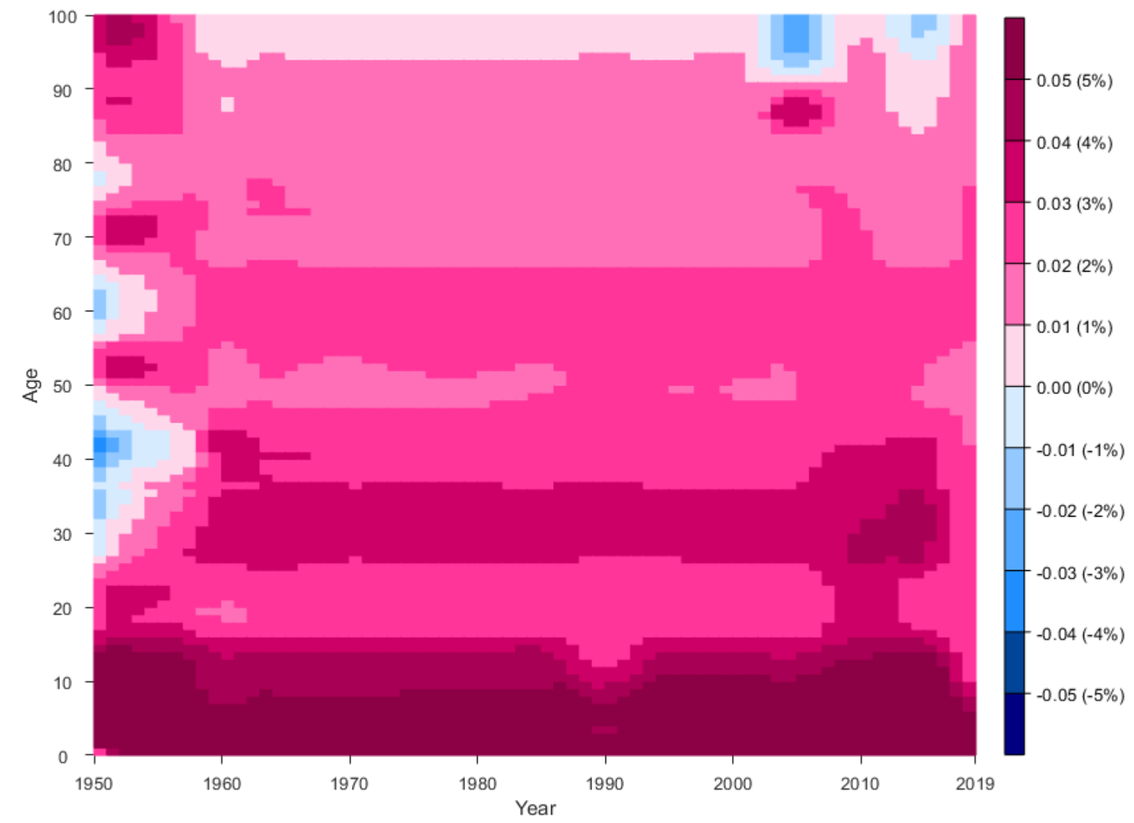


Females



Réunion

Males



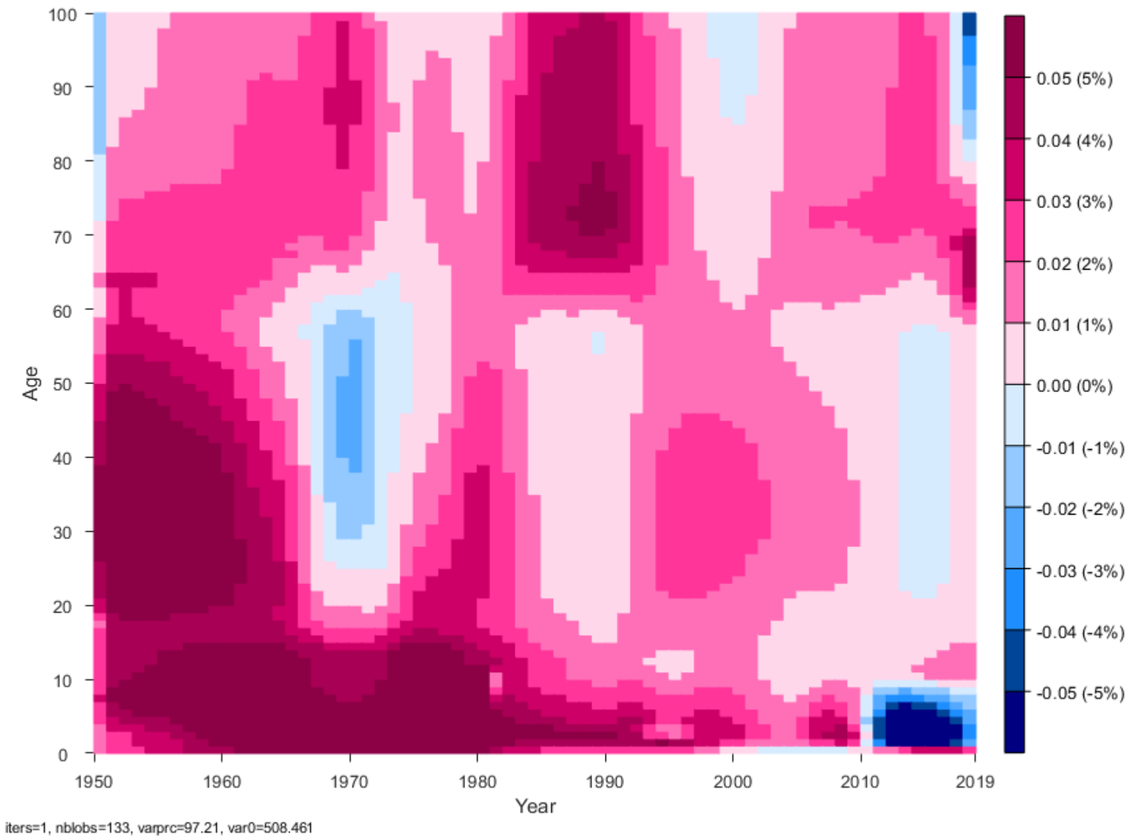
iters=1, nblobs=65, varprc=98.4011, var0=347.826

Females

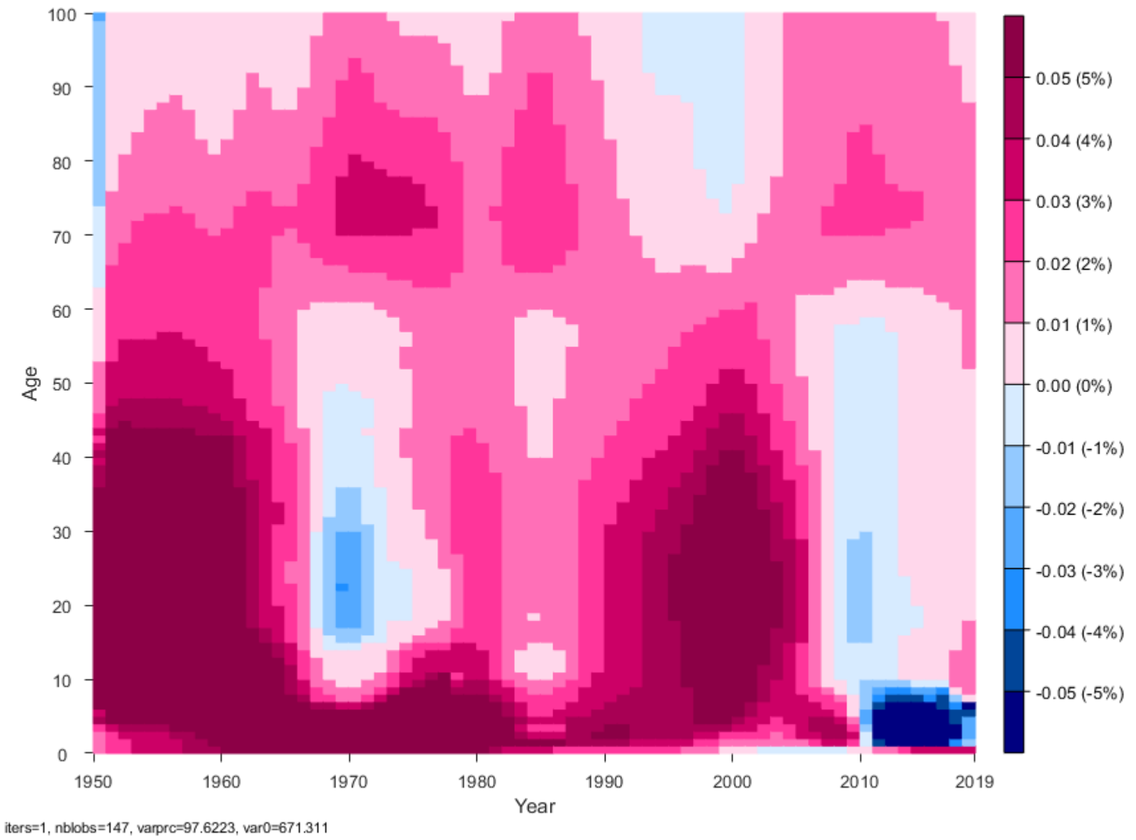
iters=1, nblobs=85, varprc=97.4737, var0=530.735

Saint Lucia

Males

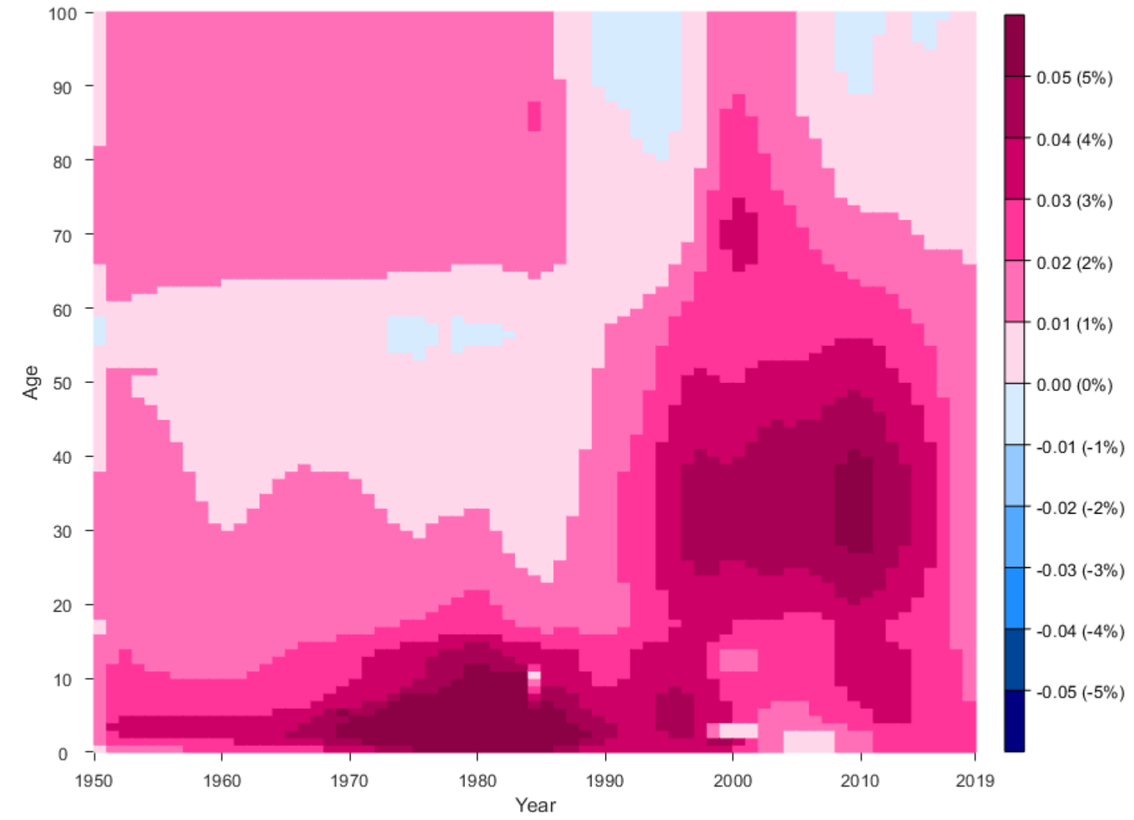


Females



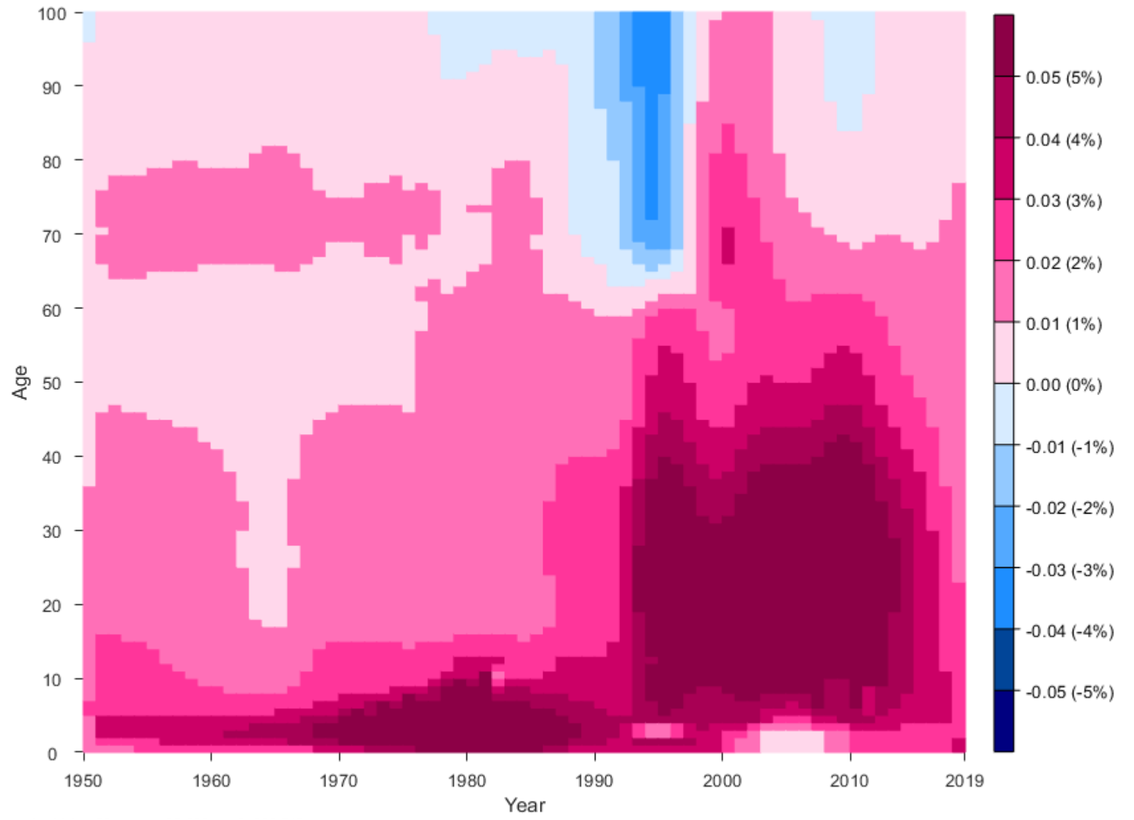
Samoa

Males



iters=1, nblobs=46, varprc=98.0996, var0=202.586

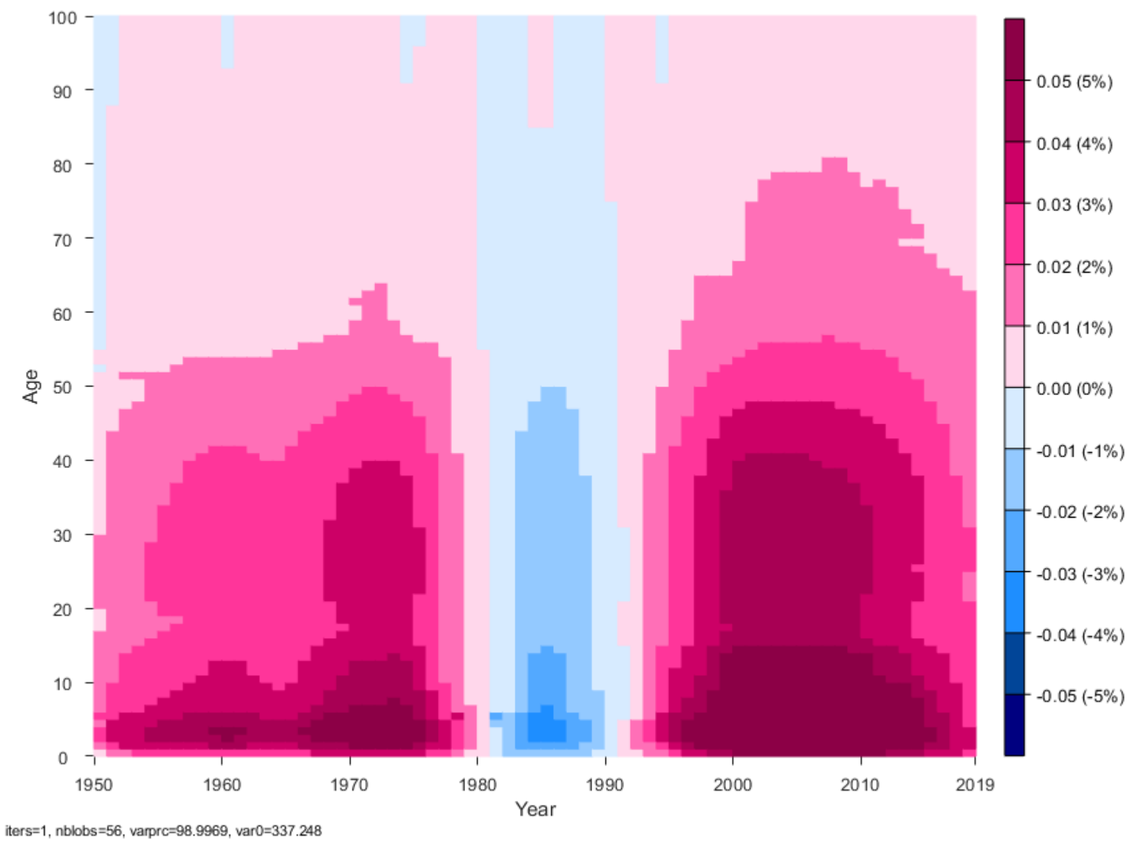
Females



iters=1, nblobs=58, varprc=98.639, var0=389.715

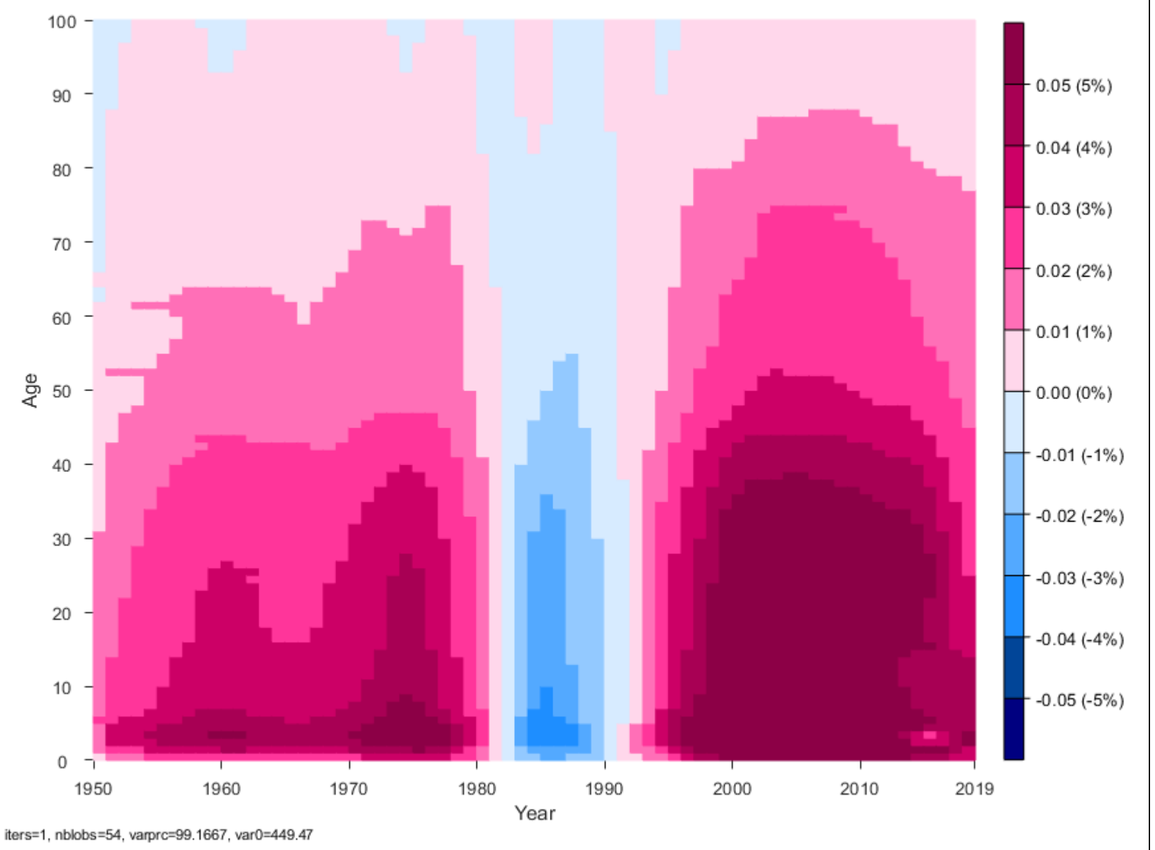
Sao Tome and Principe

Males



iters=1, nblobs=56, varprc=98.9969, var0=337.248

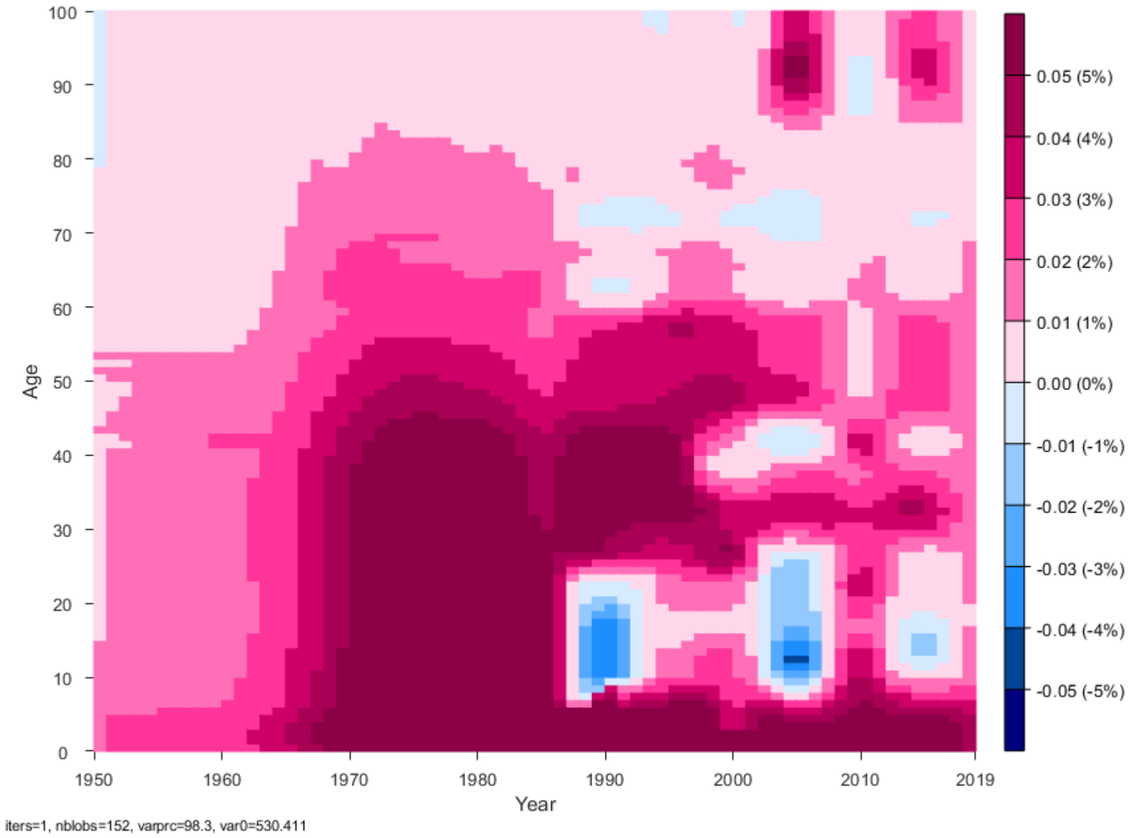
Females



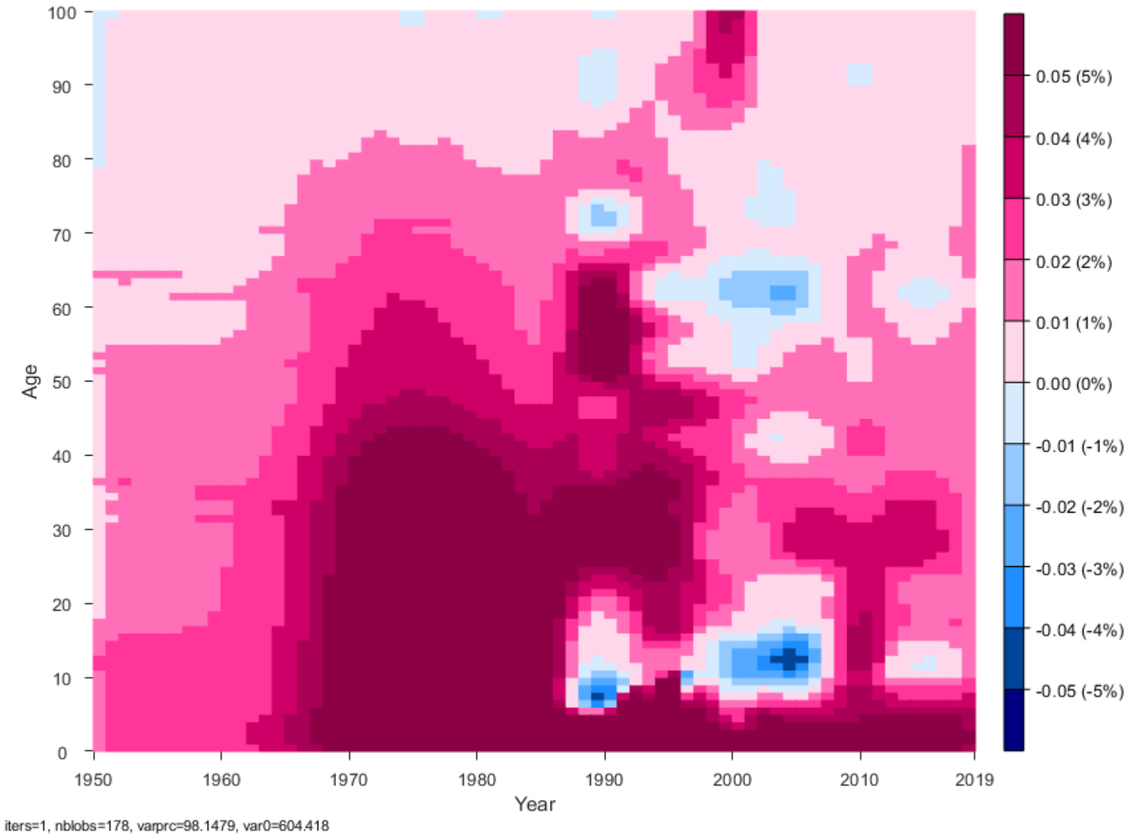
iters=1, nblobs=54, varprc=99.1667, var0=449.47

Saudi Arabia

Males

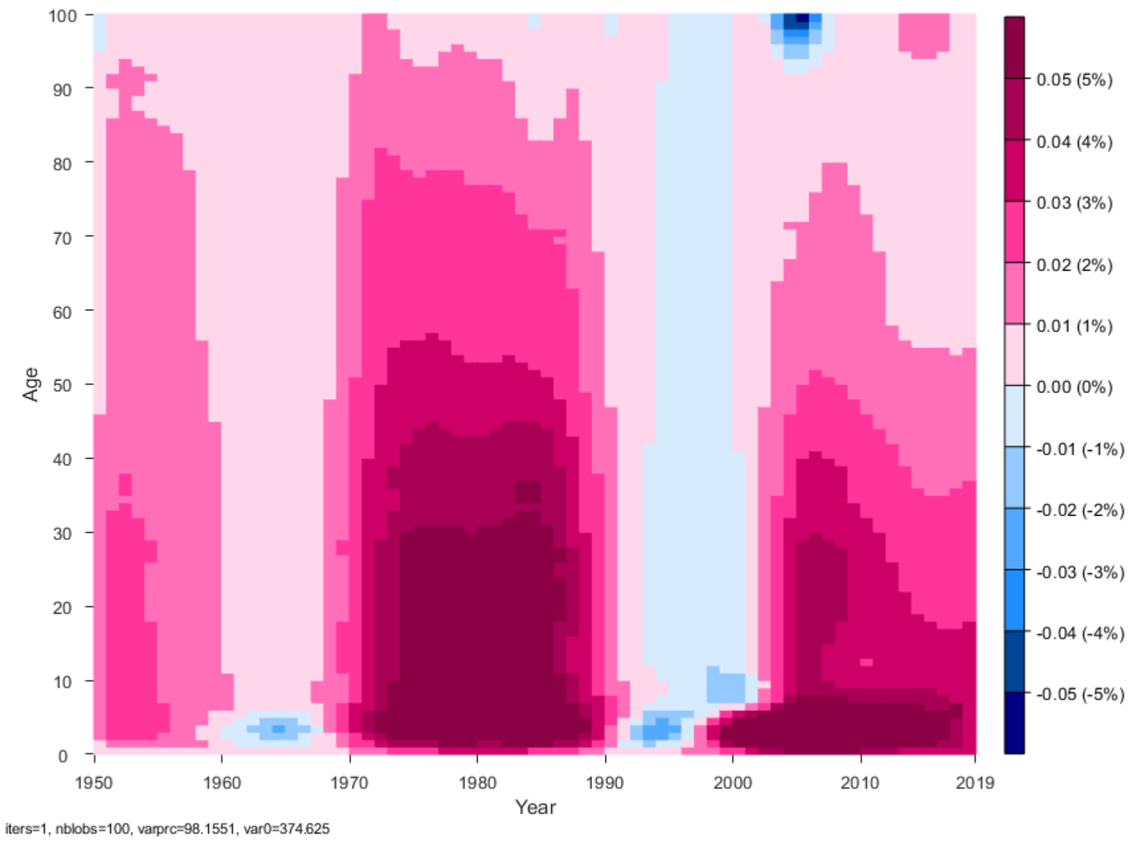


Females



Senegal

Males



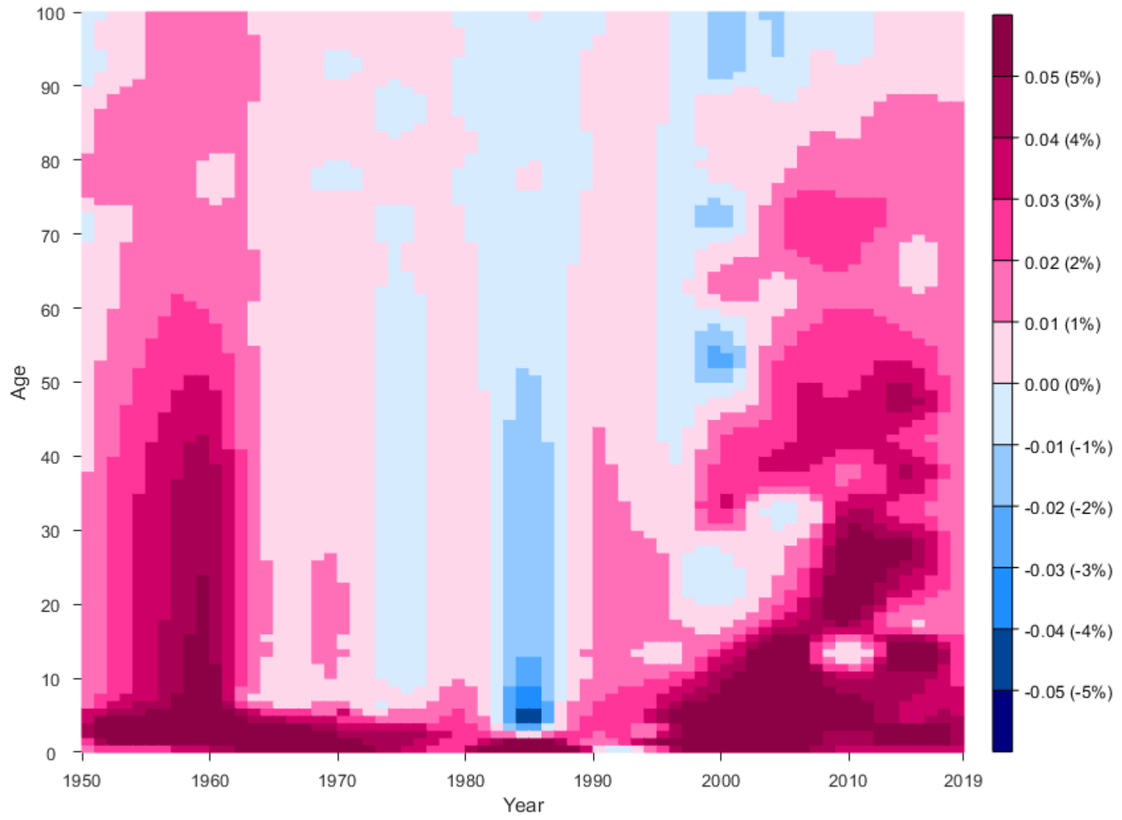
iters=1, nblobs=100, varprc=98.1551, var0=374.625

Females

iters=1, nblobs=95, varprc=98.478, var0=491.988

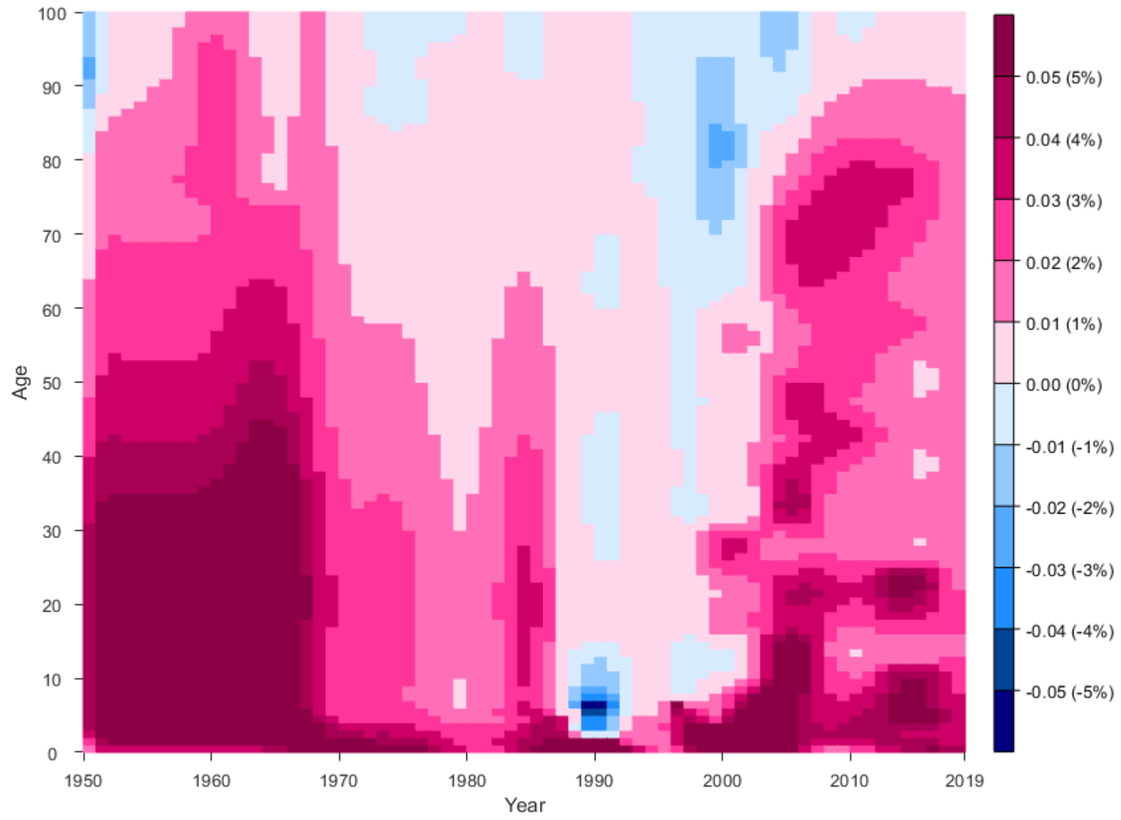
Serbia

Males



iters=1, nblobs=172, varprc=97.6537, var0=335.724

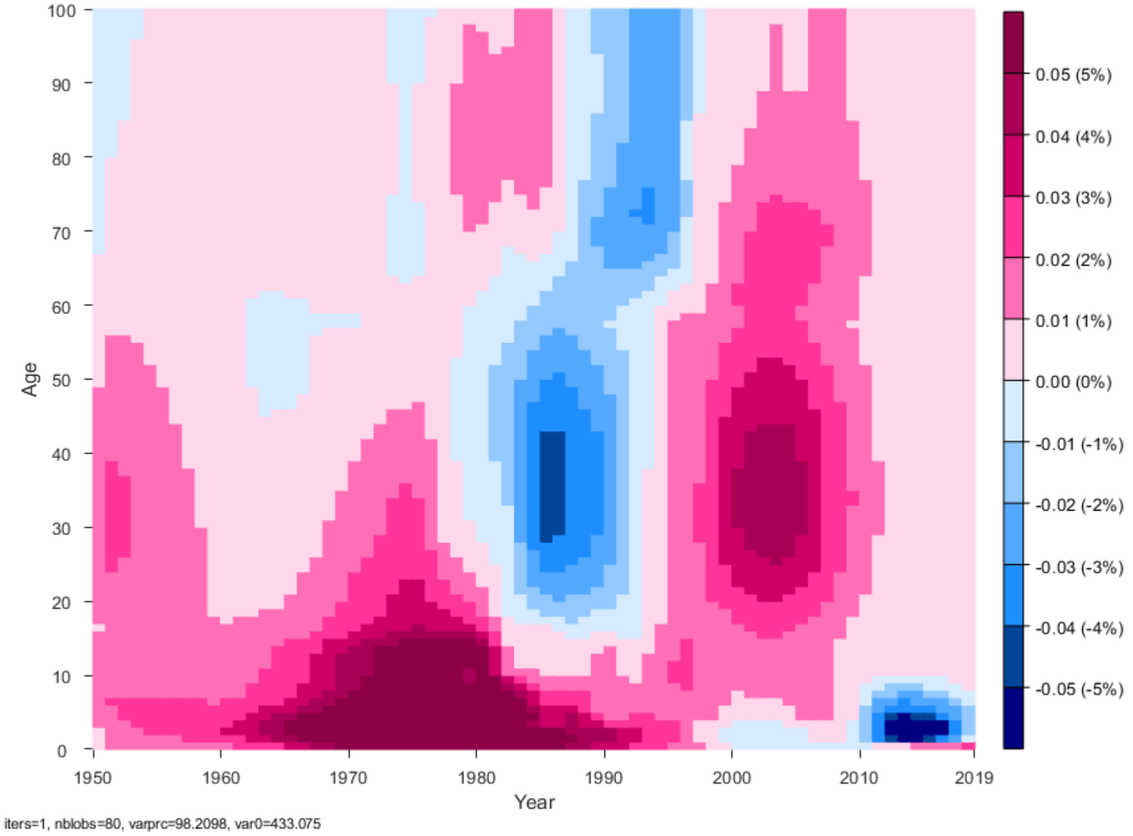
Females



iters=1, nblobs=143, varprc=97.9962, var0=416.717

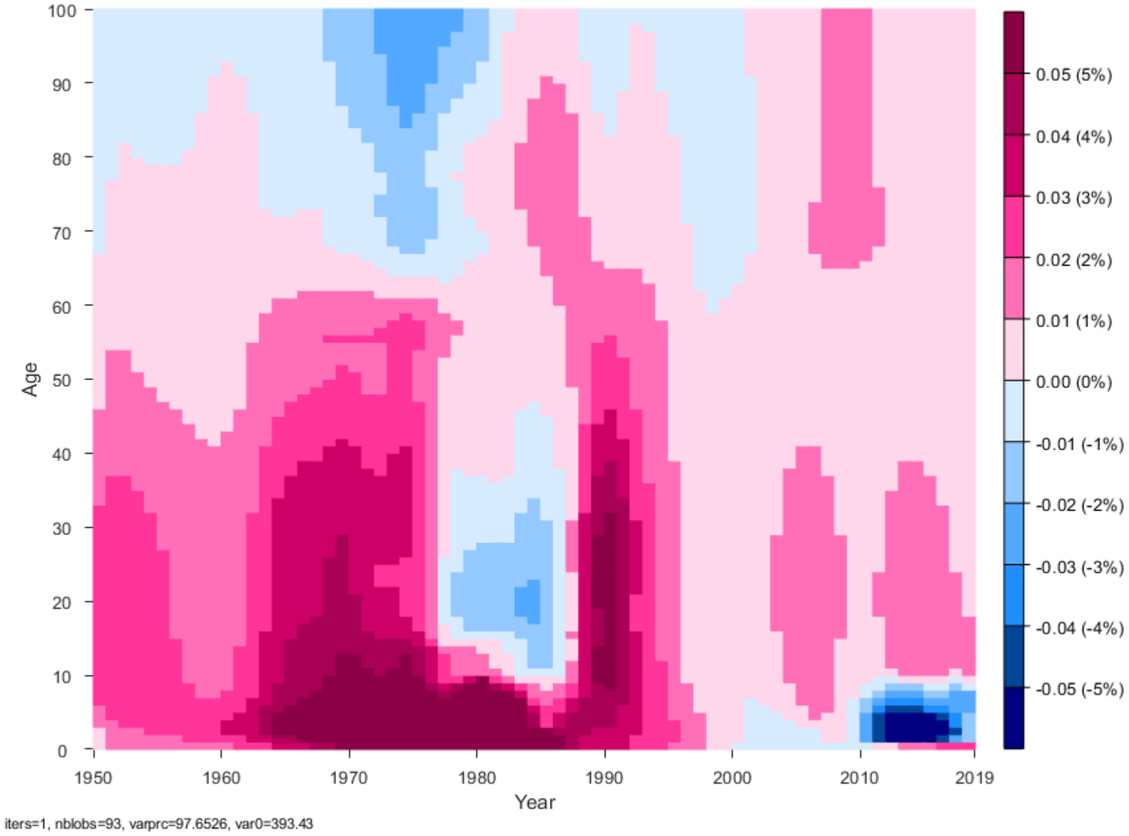
Seychelles

Males



iters=1, nblobs=80, varprc=98.2098, var0=433.075

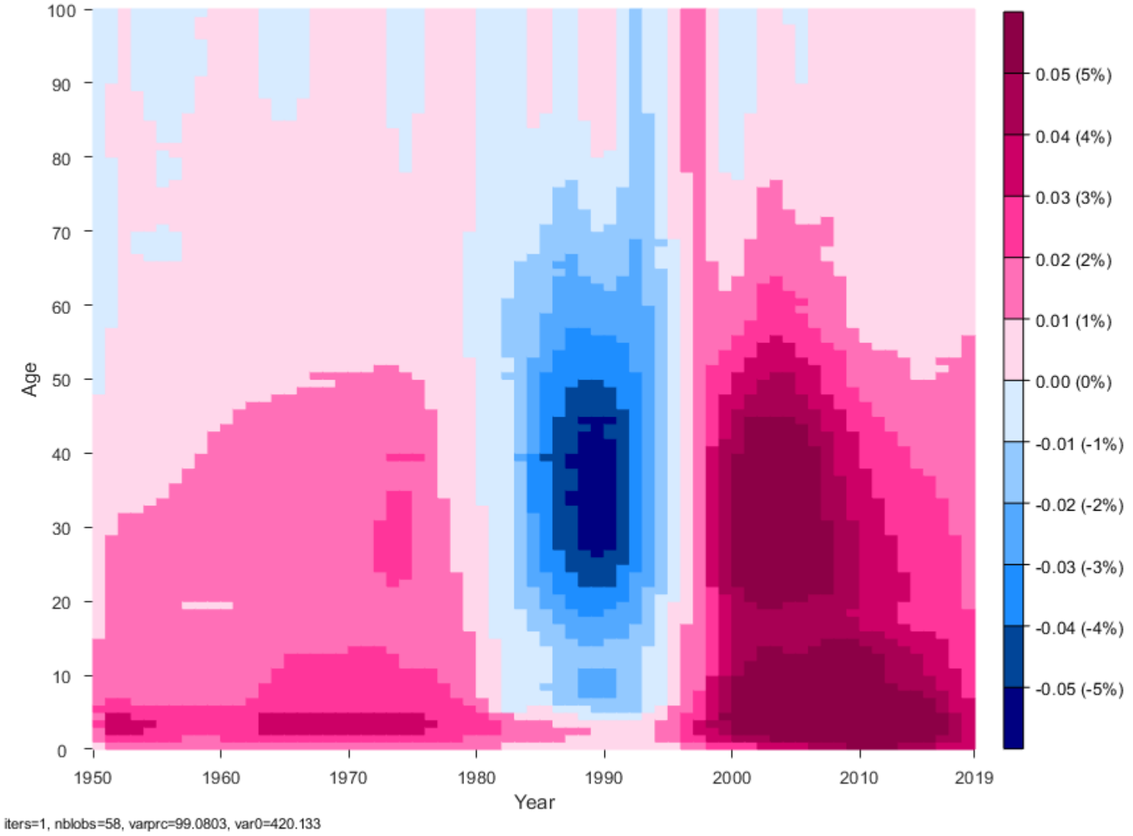
Females



iters=1, nblobs=93, varprc=97.6526, var0=393.43

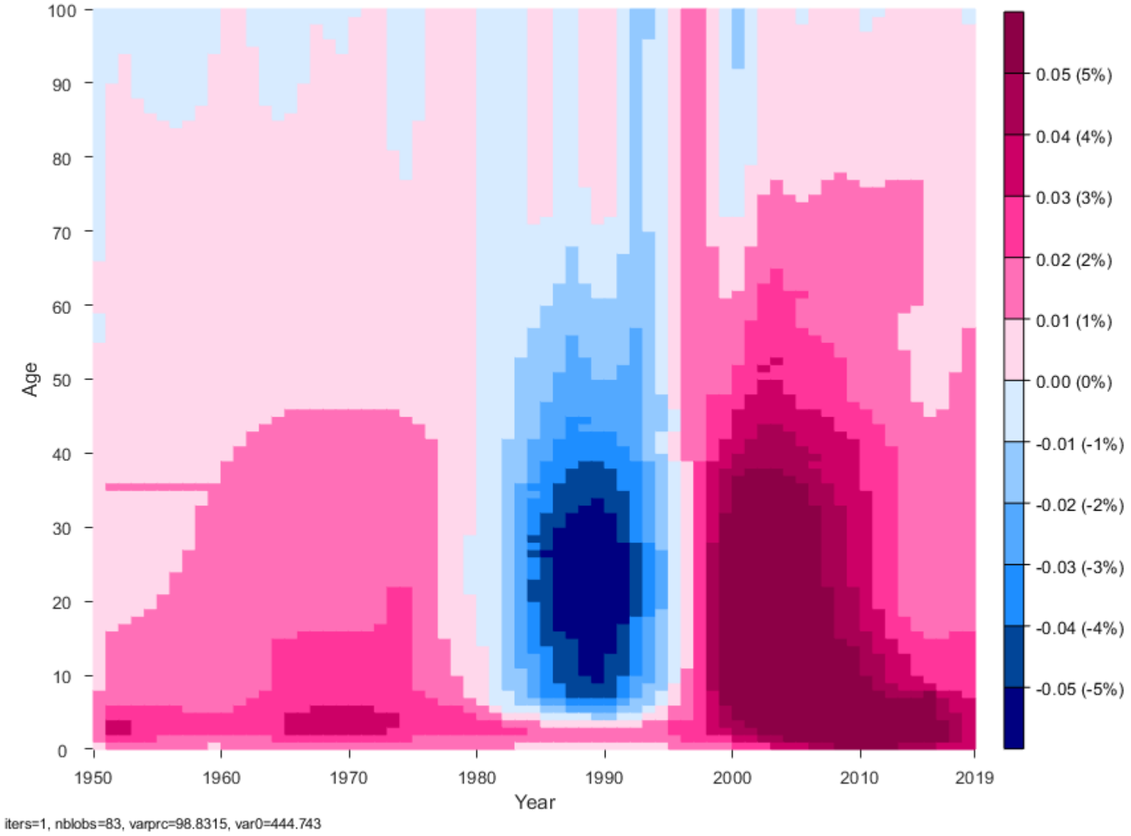
Sierra Leone

Males



iters=1, nblobs=58, varprc=99.0803, var0=420.133

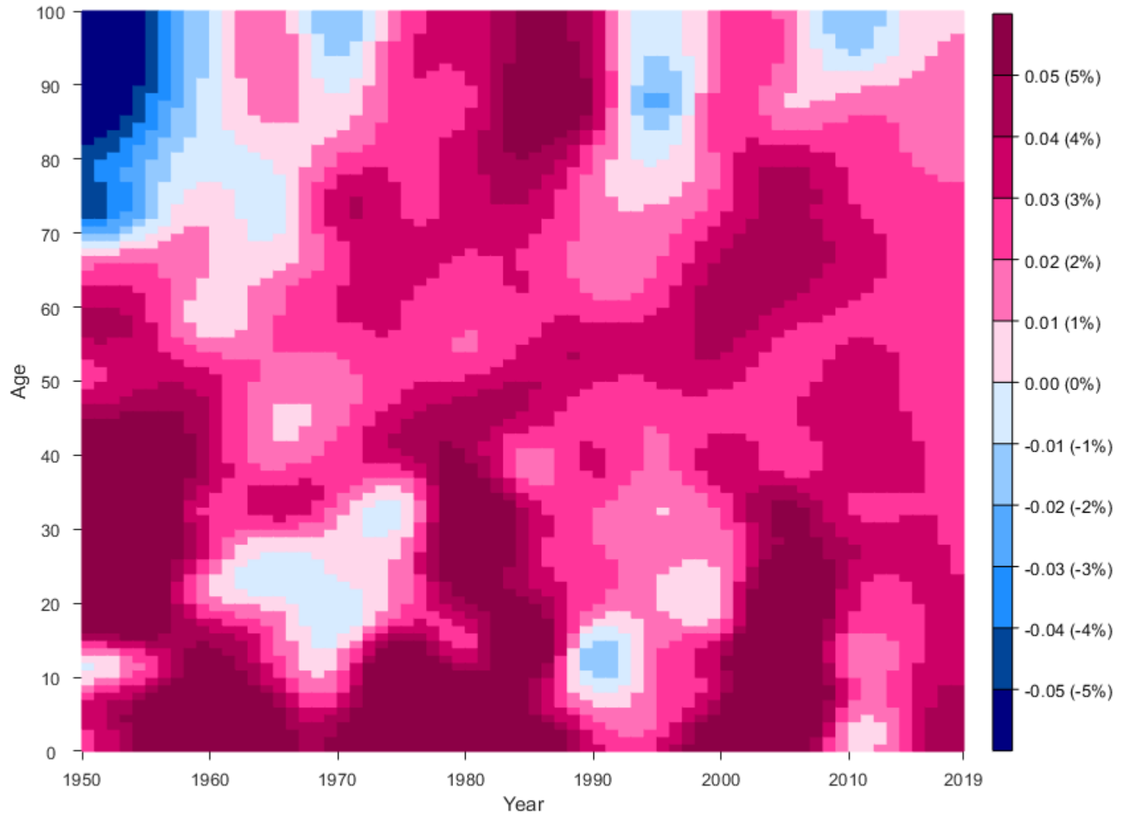
Females



iters=1, nblobs=83, varprc=98.8315, var0=444.743

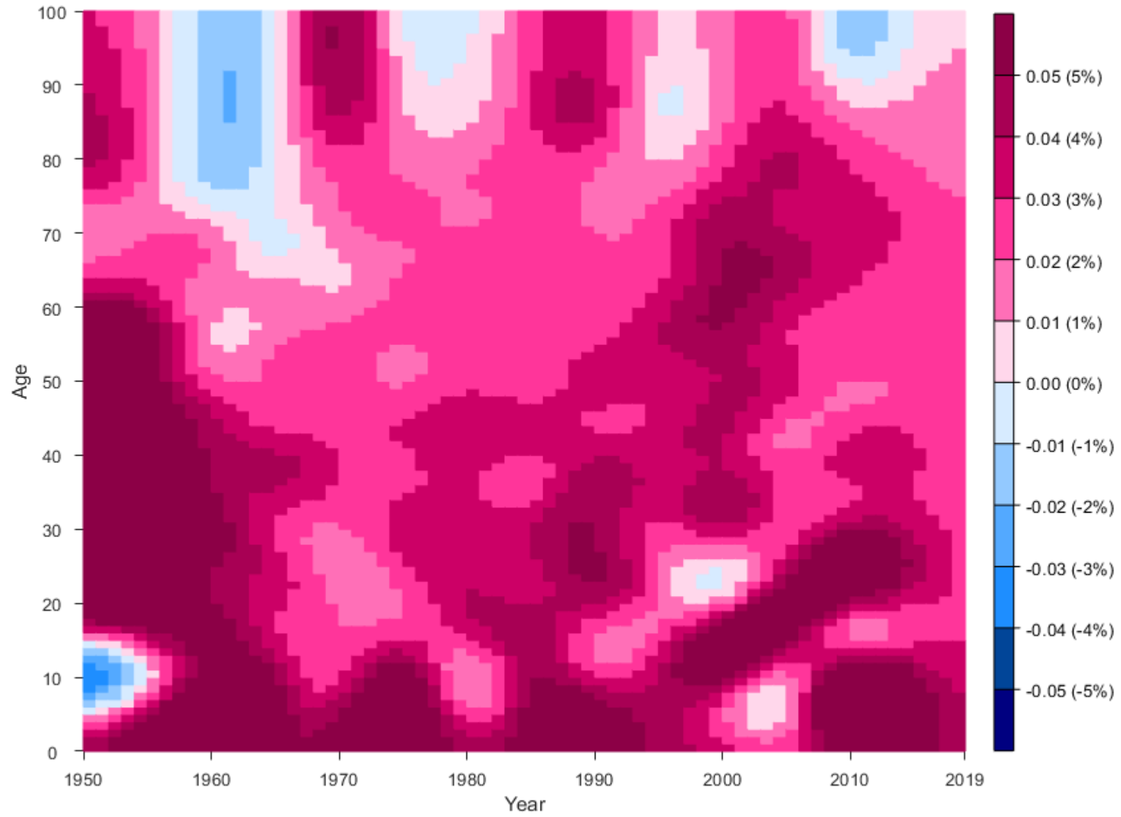
Singapore

Males



iters=34, nblobs=192, varprc=43.8327, var0=1473.56

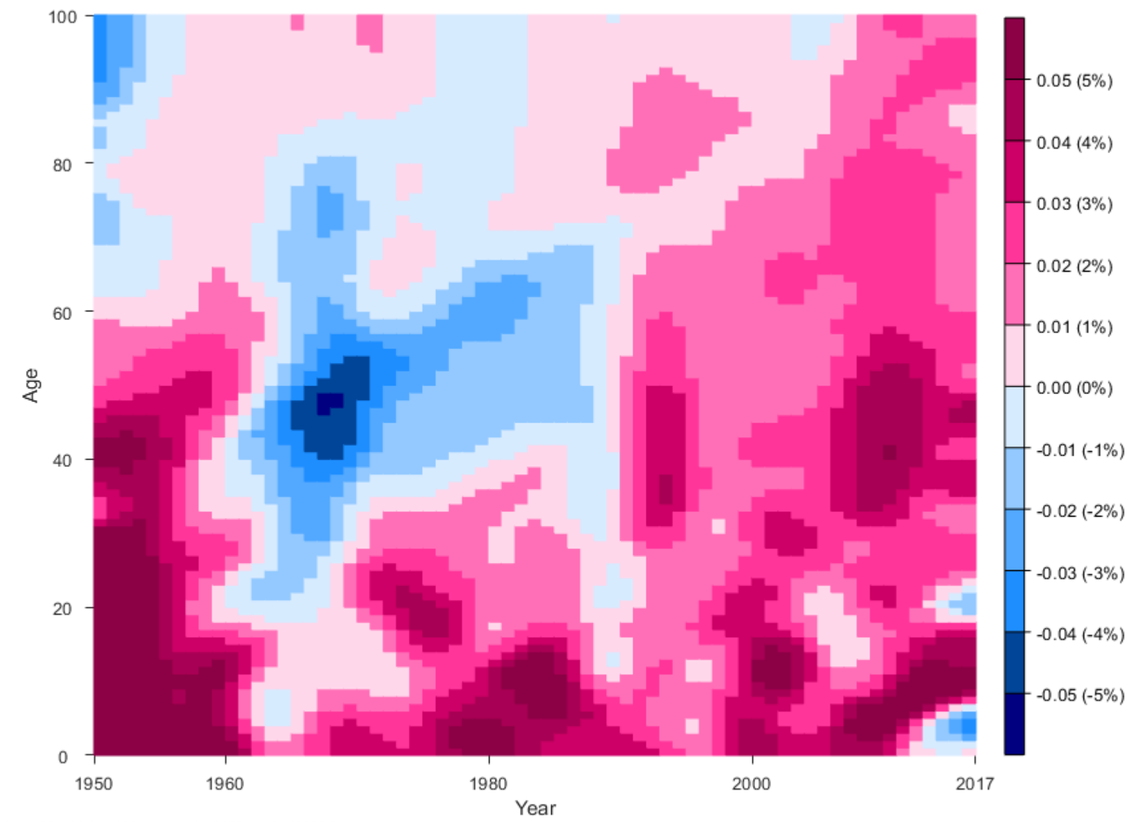
Females



iters=44, nblobs=192, varprc=31.0468, var0=1452.8

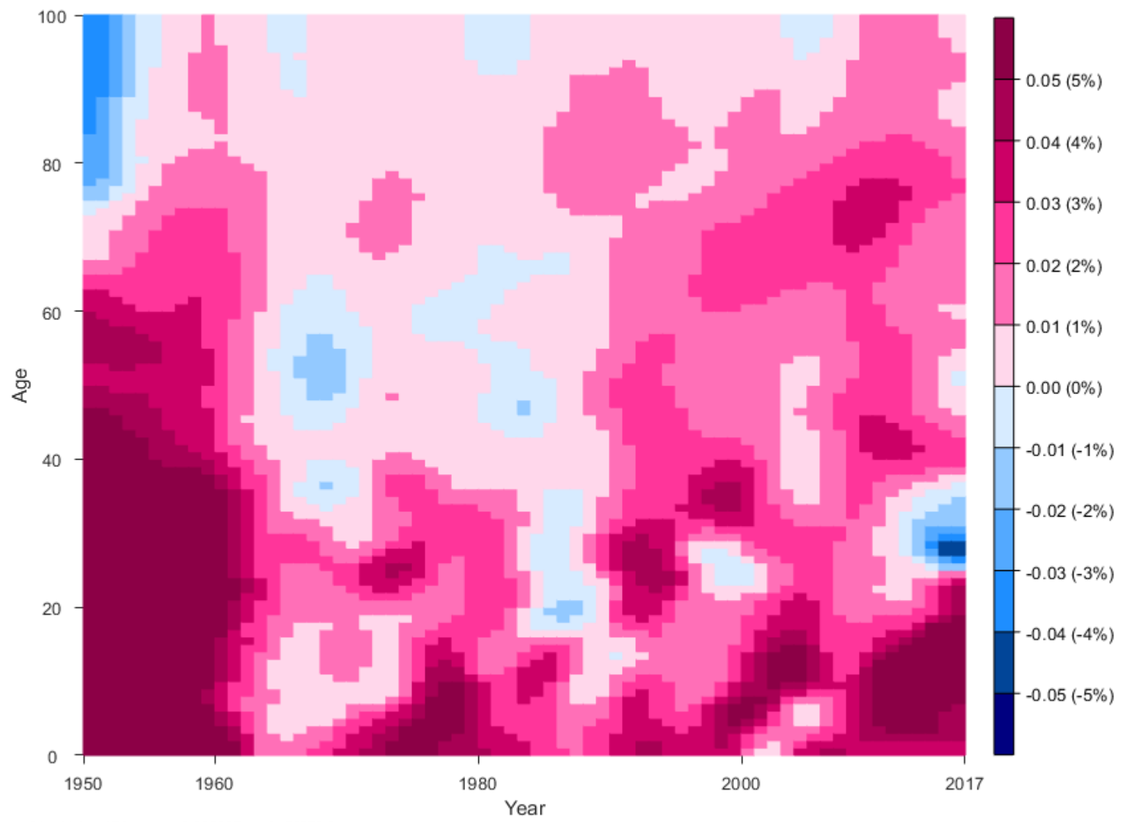
Slovakia

Males



iters=29, nblobs=188, varprc=1.12457, var0=43800.2

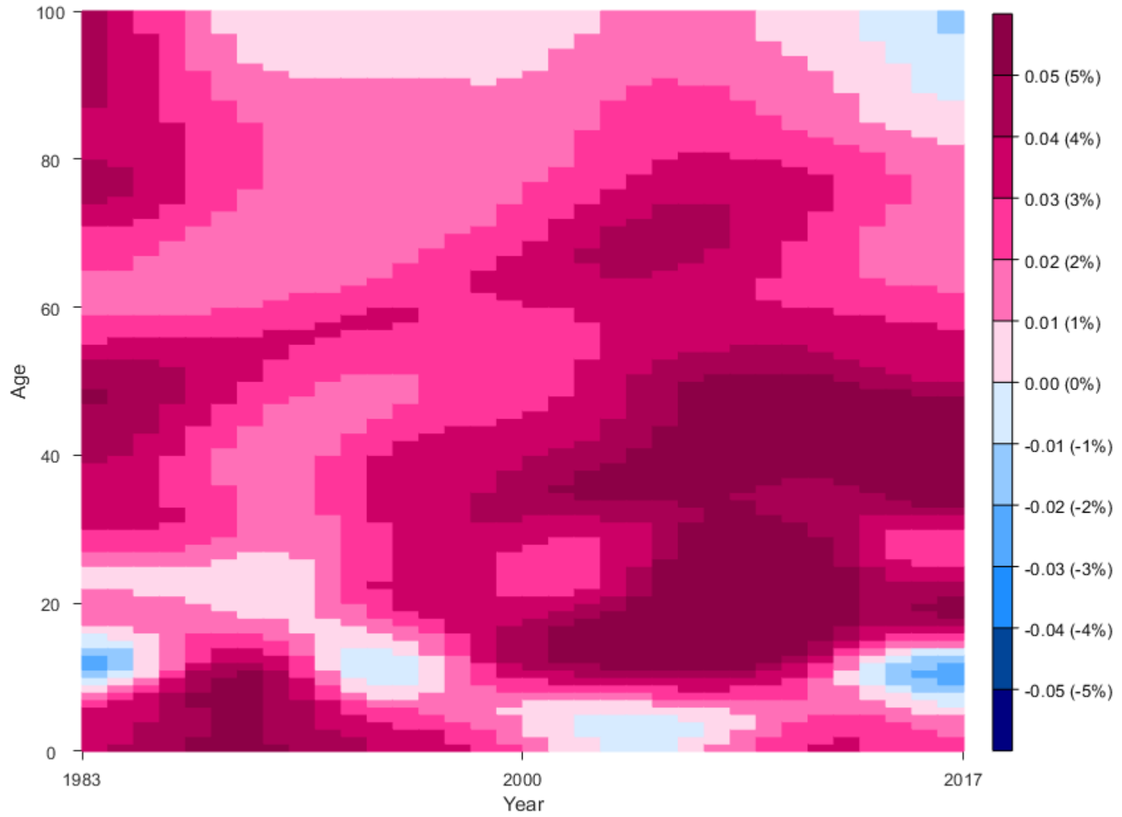
Females



iters=31, nblobs=174, varprc=0.935067, var0=78676.3

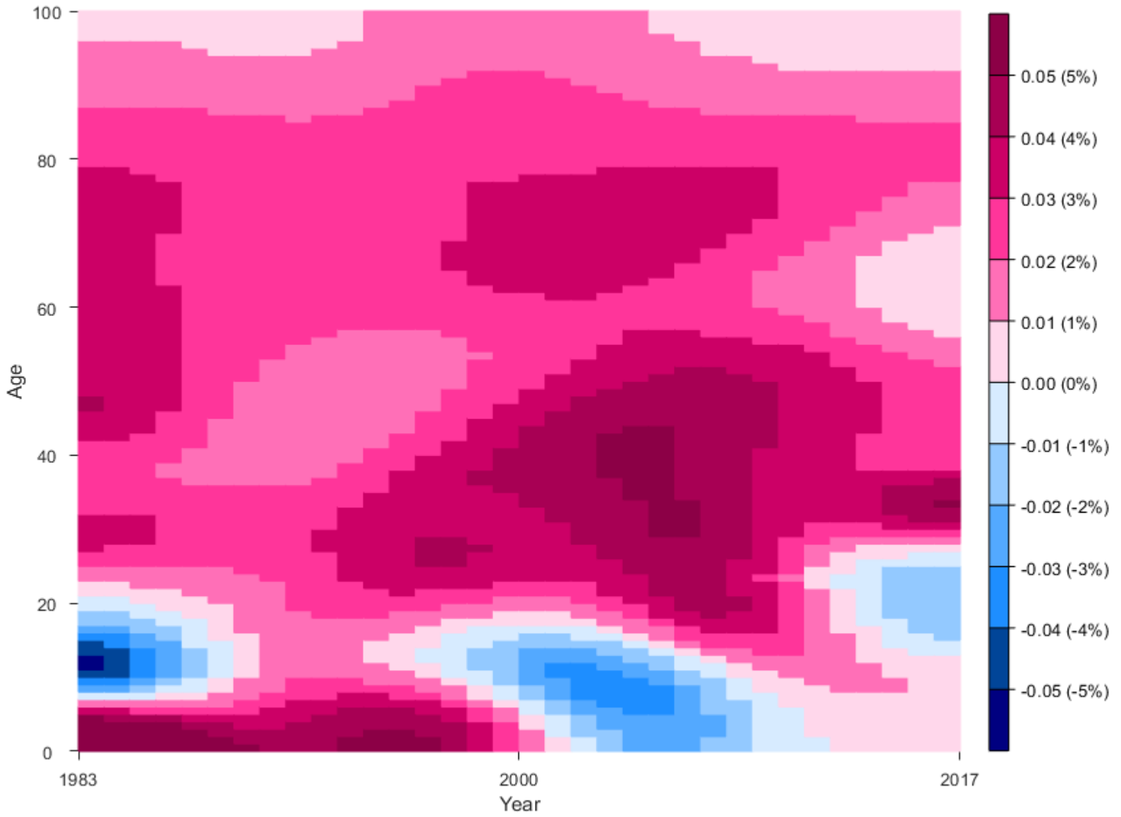
Slovenia

Males



iters=47, nblobs=96, varprc=0.302216, var0=98363

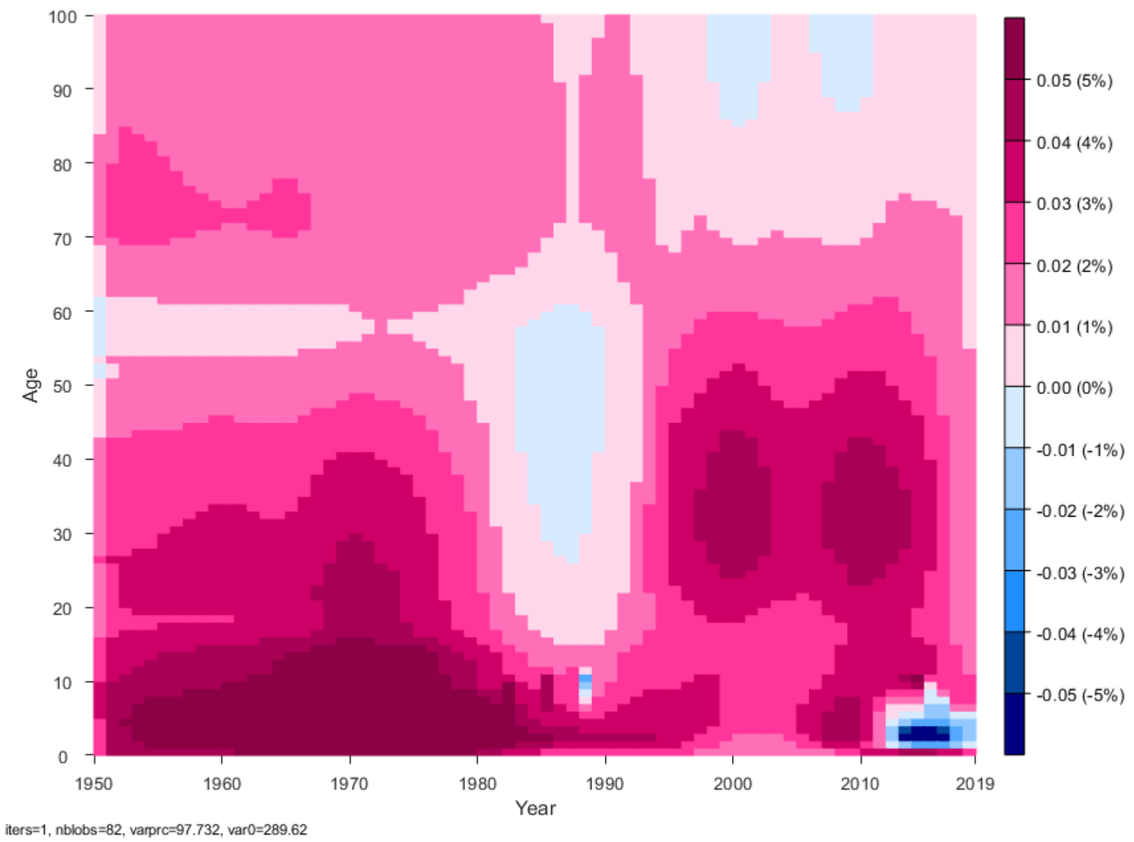
Females



iters=74, nblobs=91, varprc=0.145181, var0=183144

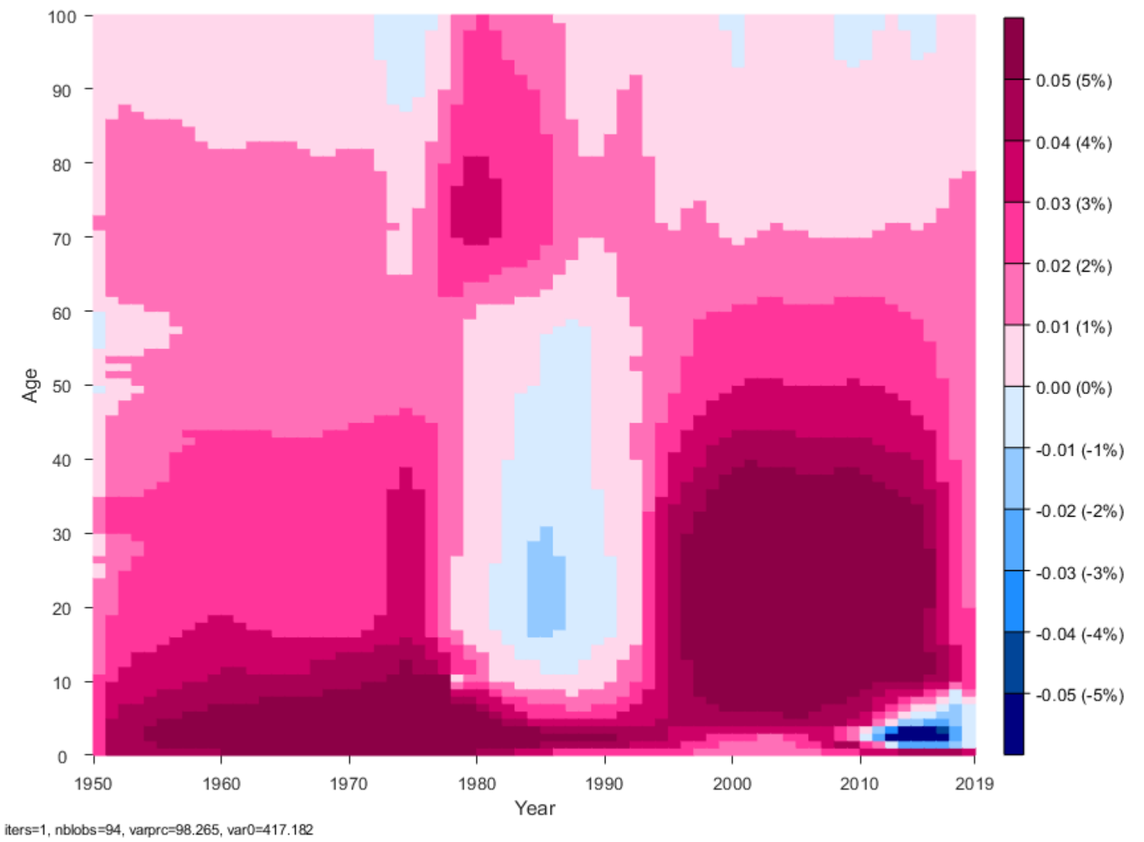
Solomon Islands

Males



iters=1, nblobs=82, varprc=97.732, var0=289.62

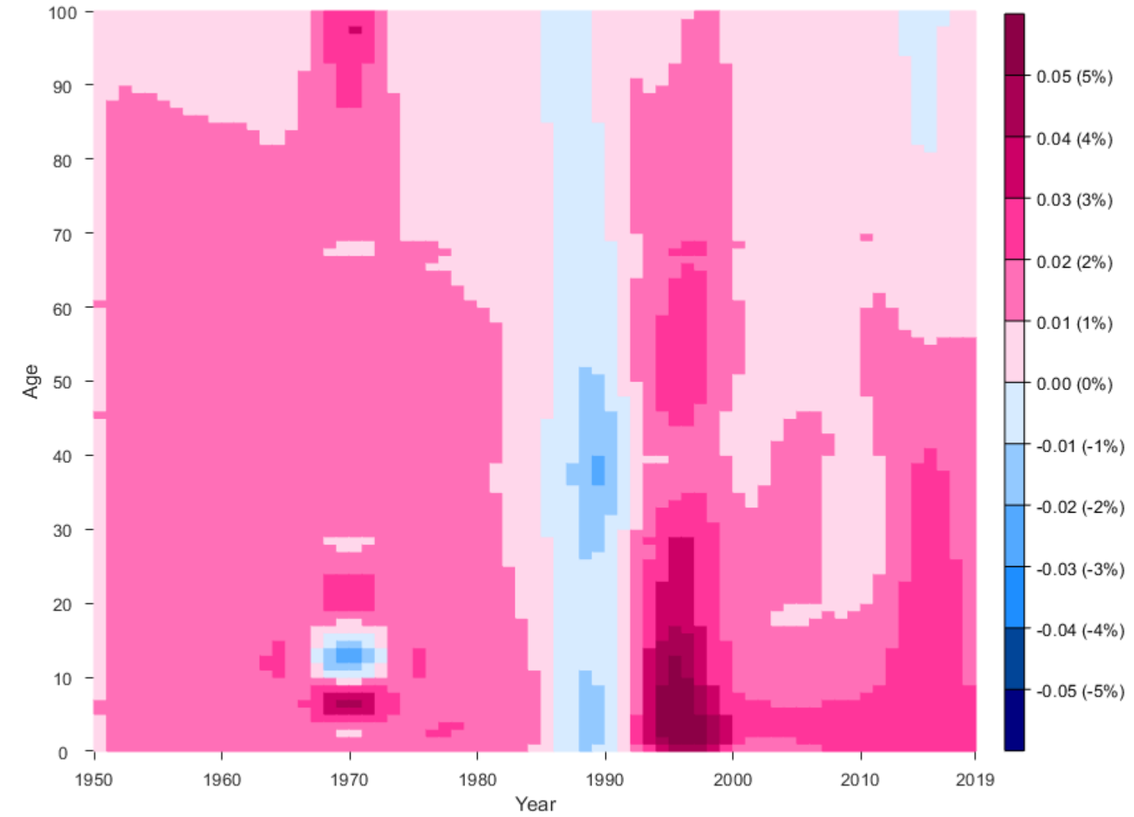
Females



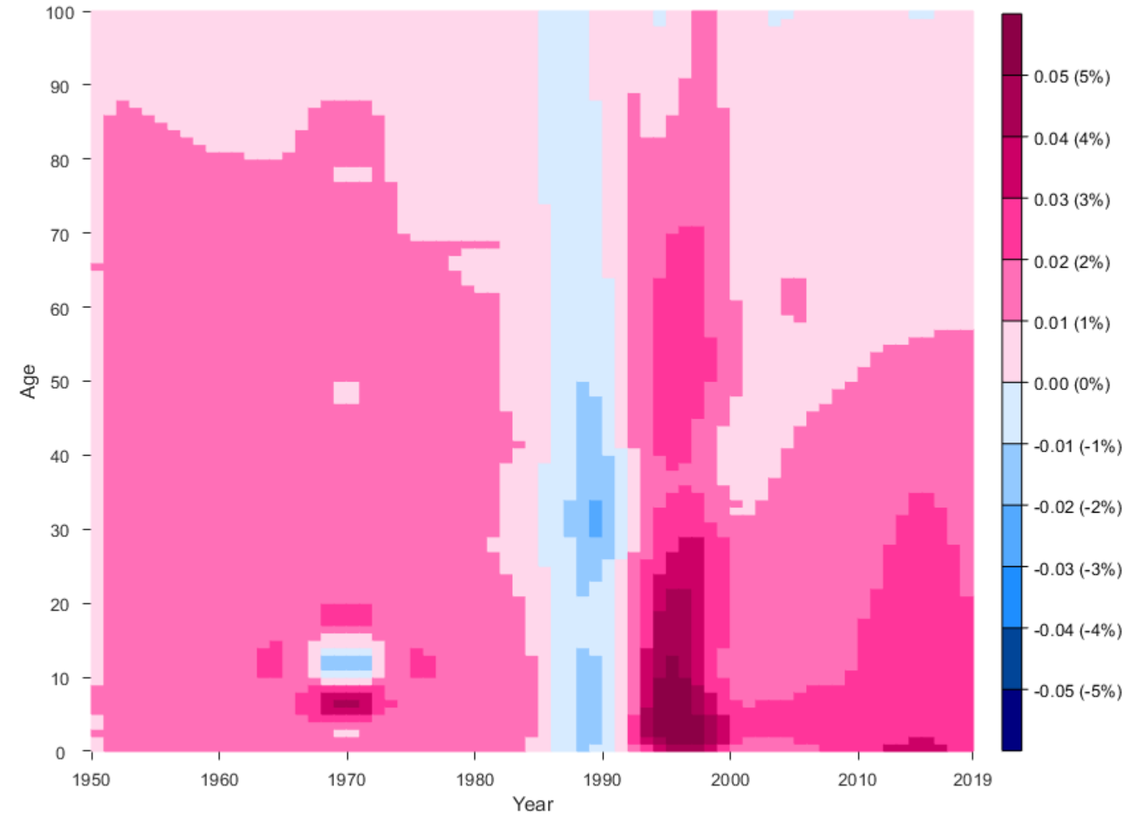
iters=1, nblobs=94, varprc=98.265, var0=417.182

Somalia

Males

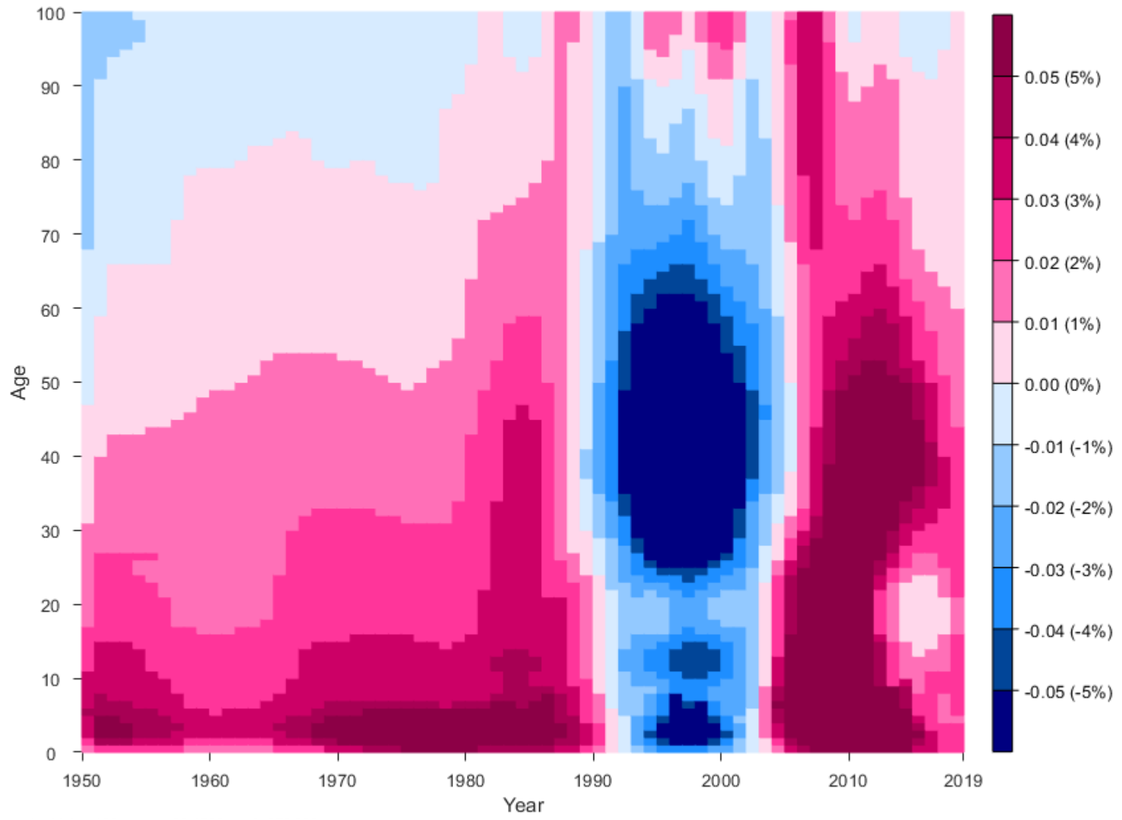


Females



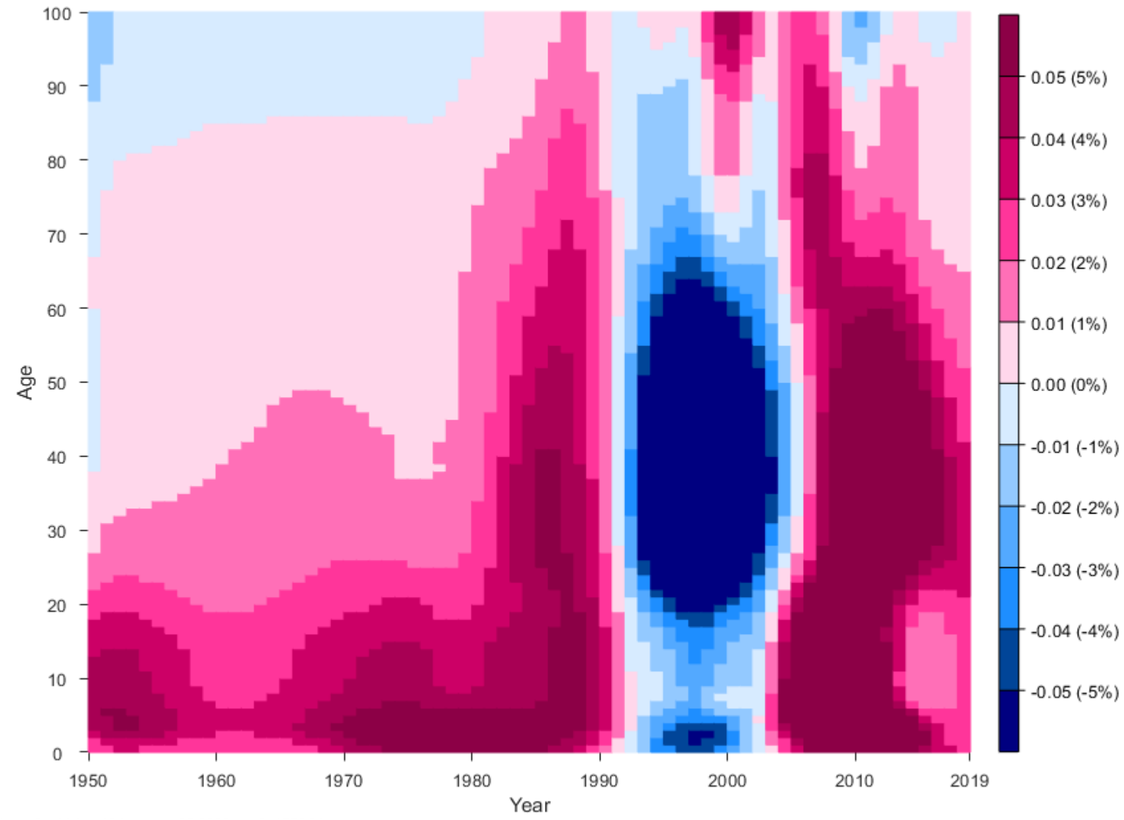
South Africa

Males



iters=1, nblobs=183, varprc=98.4799, var0=970.823

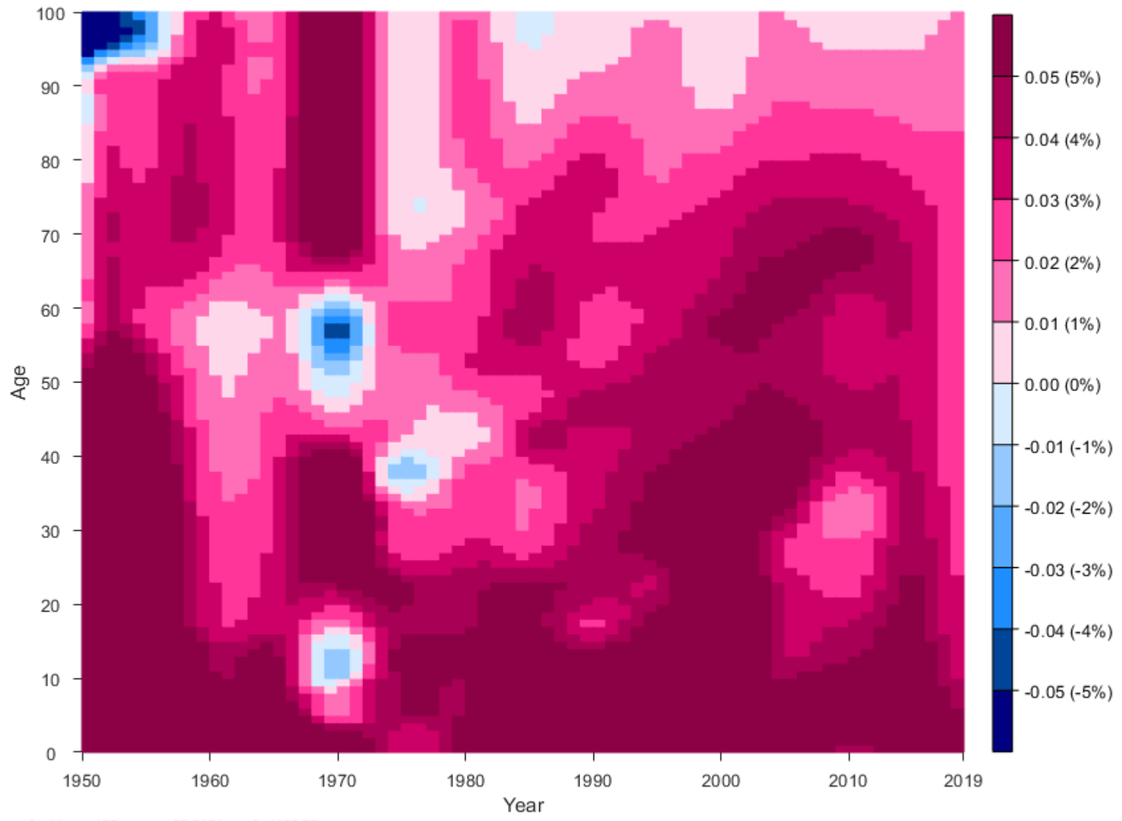
Females



iters=6, nblobs=194, varprc=92.0838, var0=1556.91

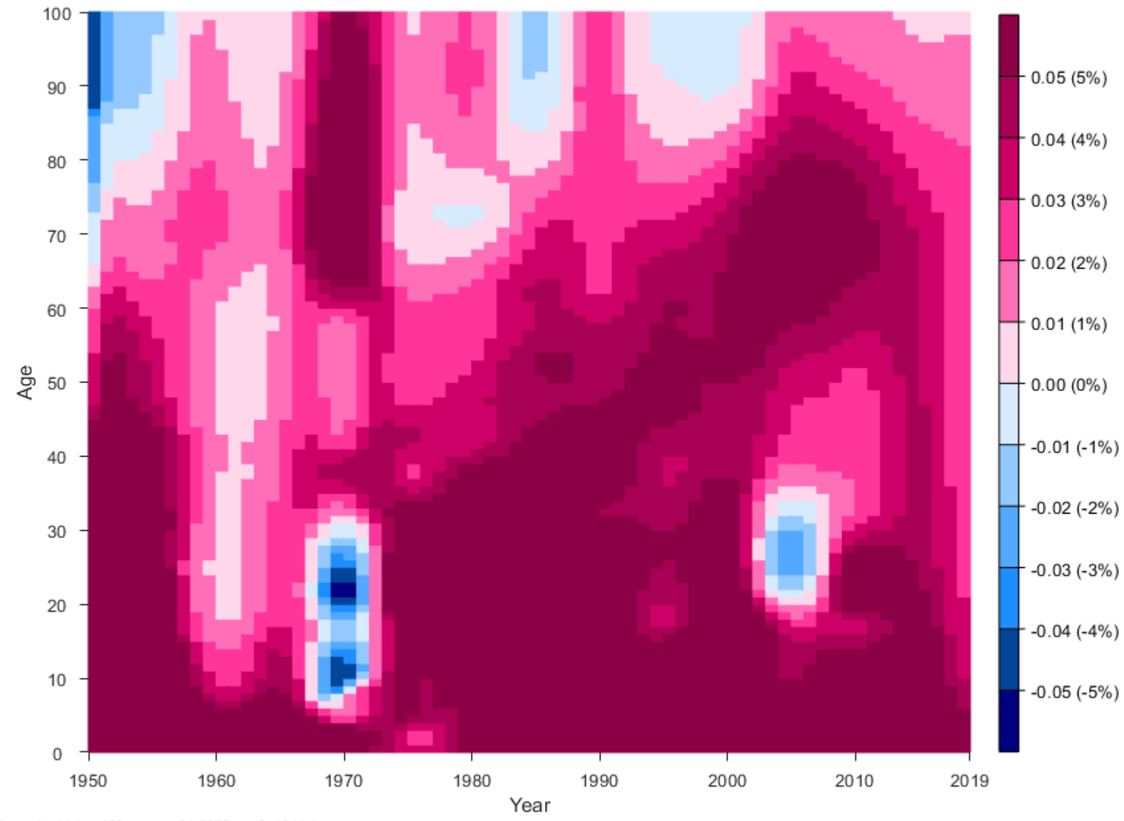
Republic of Korea

Males



iters=6, nblobs=182, varprc=87.2194, var0=1139.75

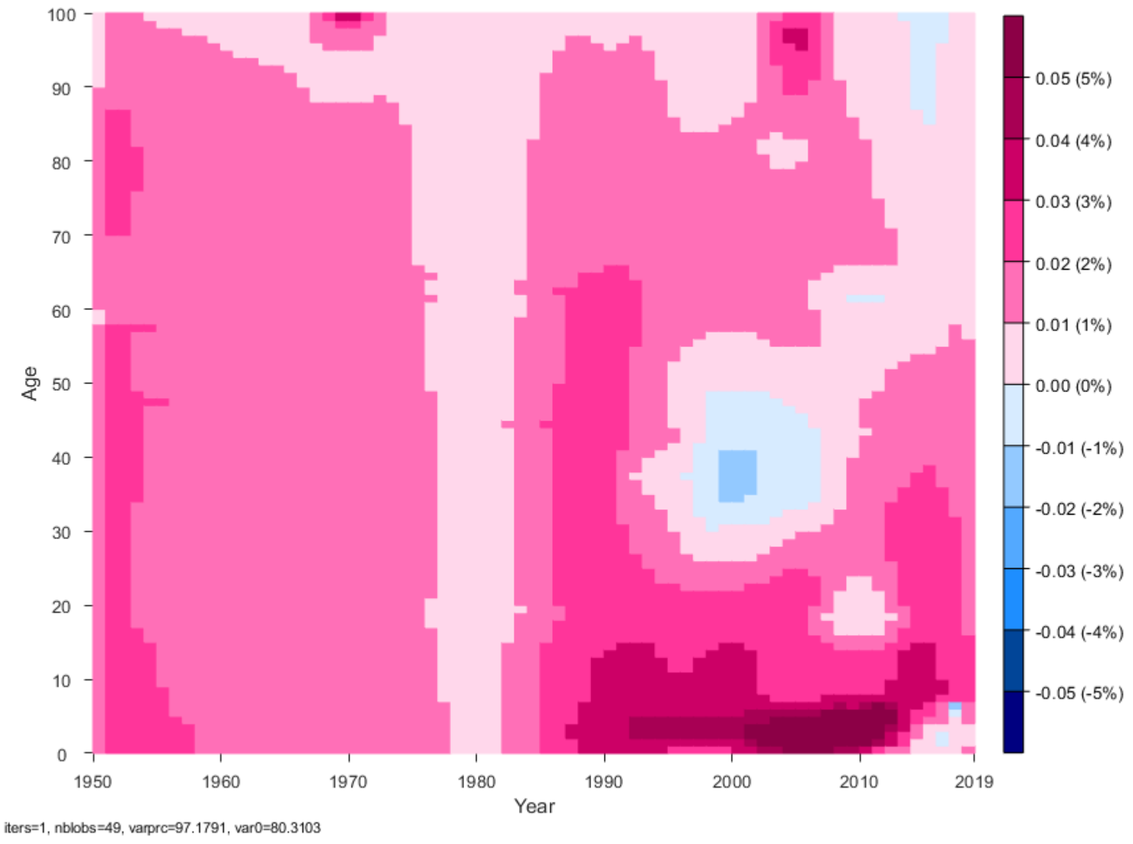
Females



iters=4, nblobs=193, varprc=91.5979, var0=1041.4

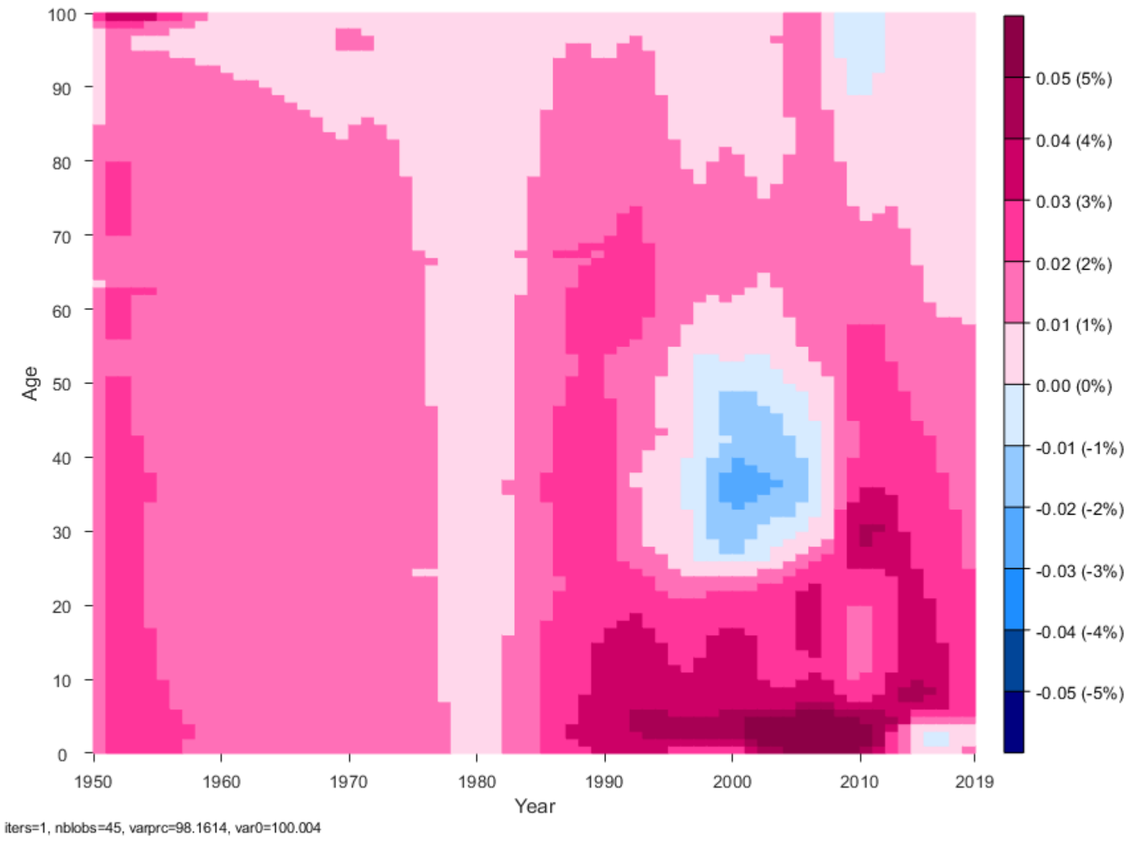
South Sudan

Males



iters=1, nblobs=49, varprc=97.1791, var0=80.3103

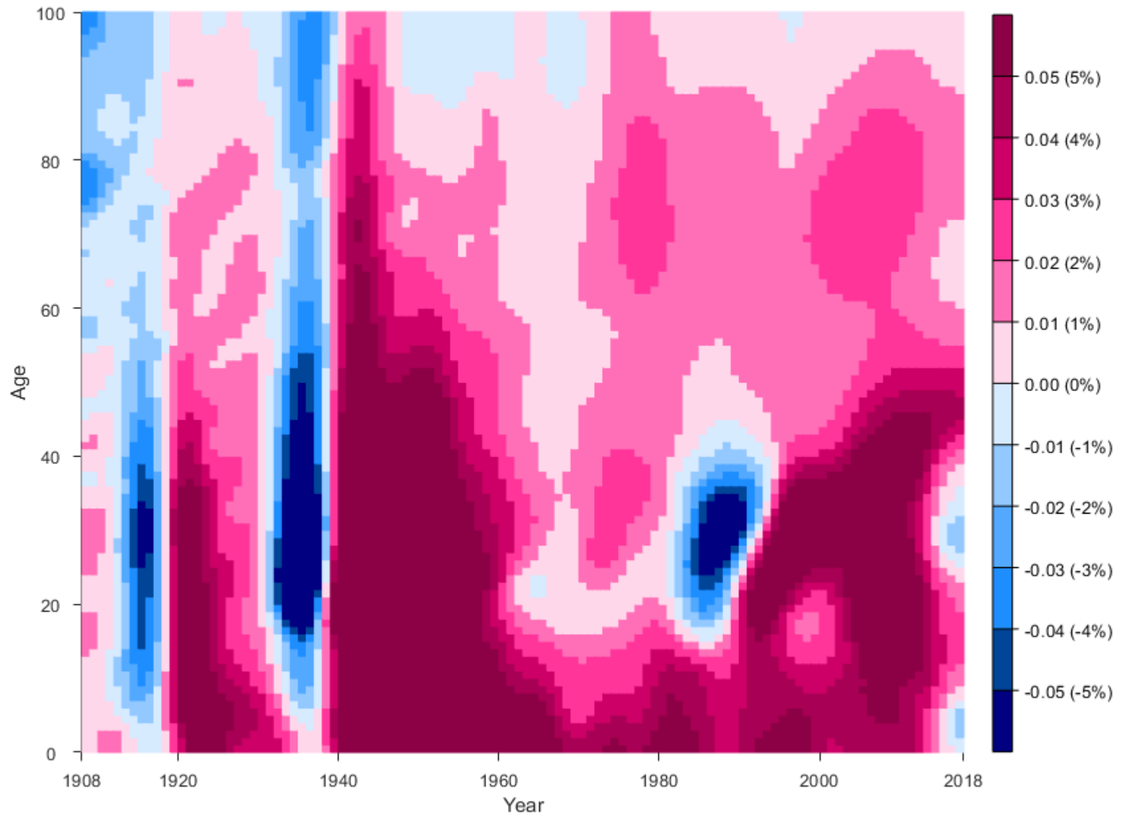
Females



iters=1, nblobs=45, varprc=98.1614, var0=100.004

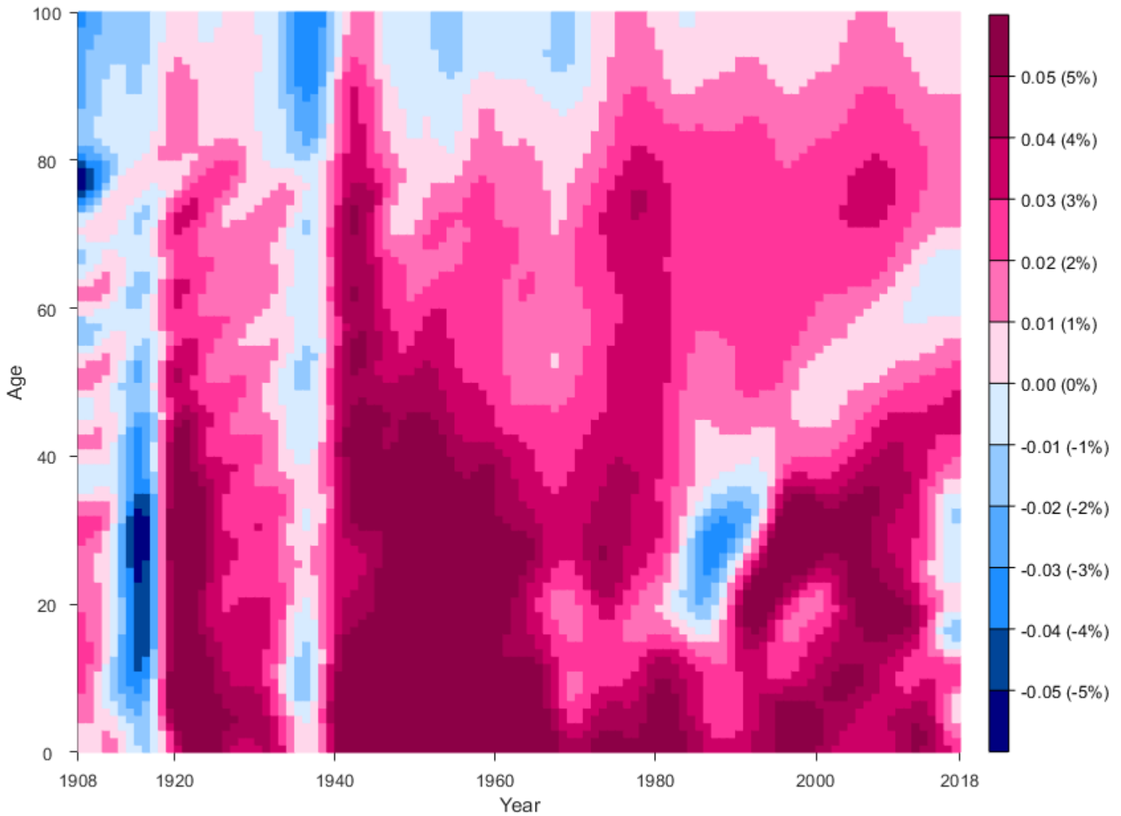
Spain

Males



iters=34, nblobs=306, varprc=4.73697, var0=20081.4

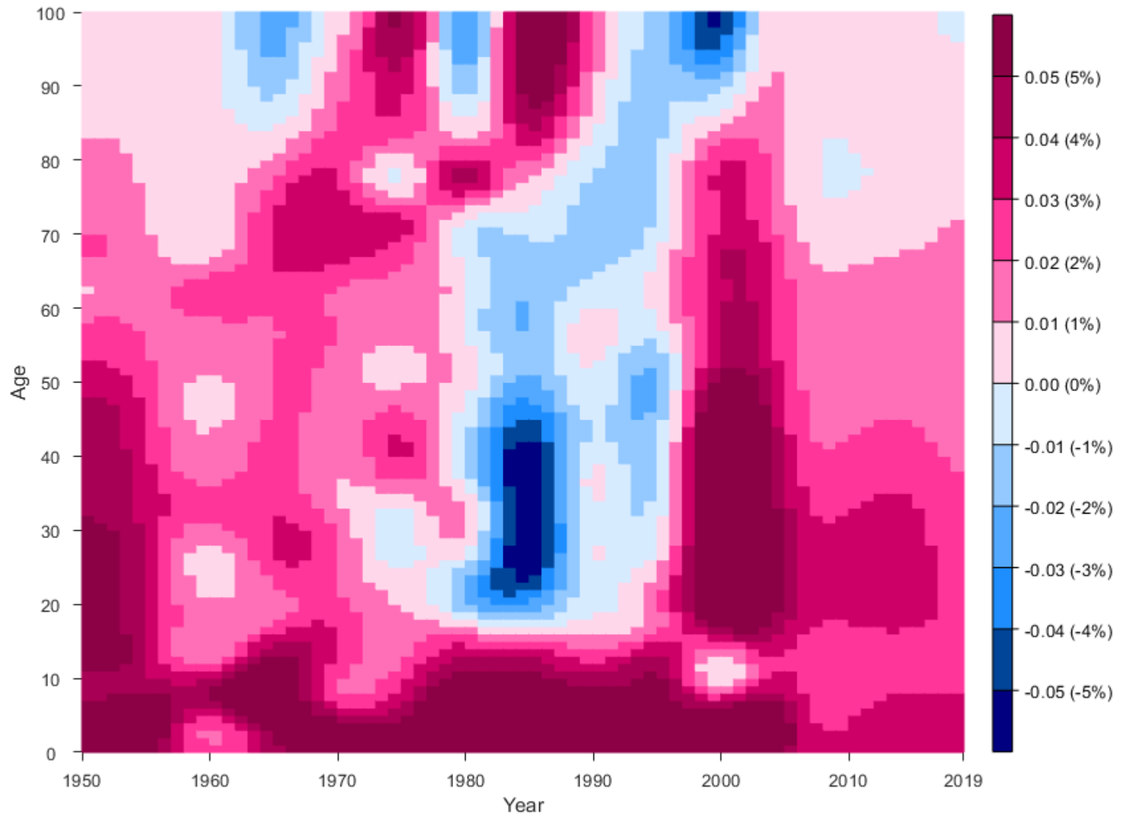
Females



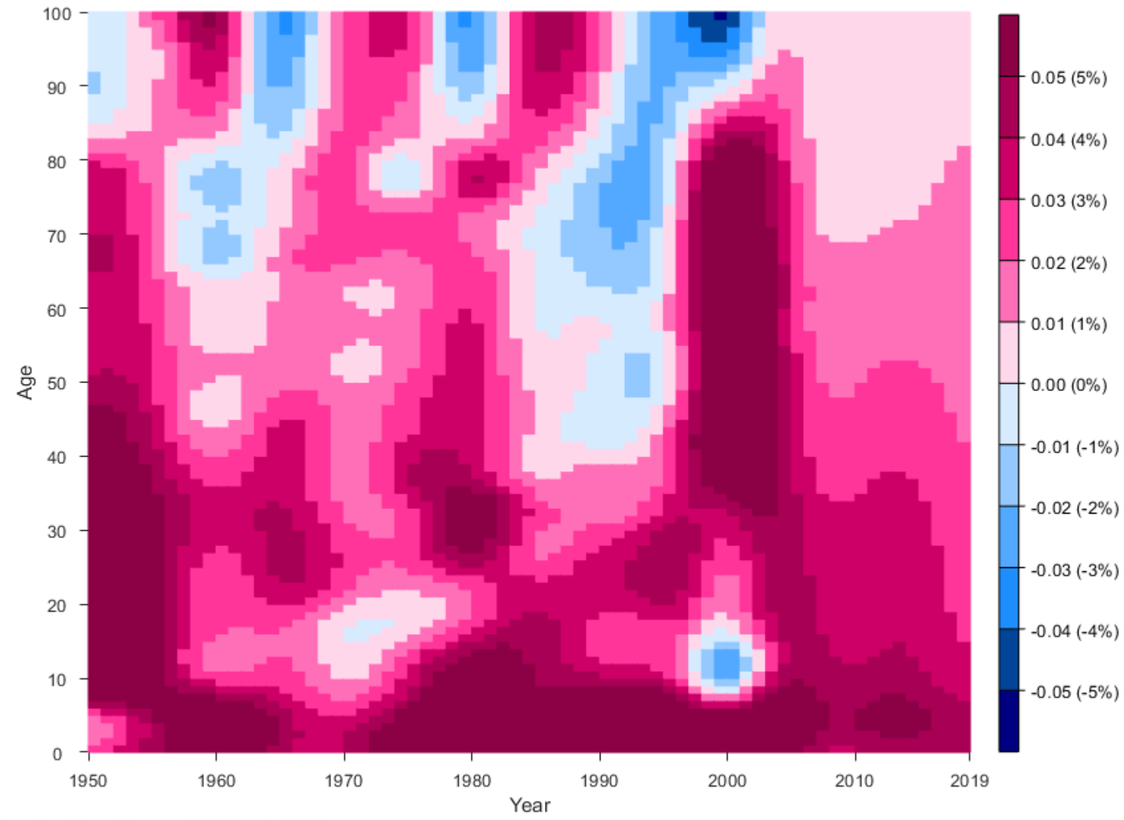
iters=30, nblobs=312, varprc=2.9316, var0=23491.4

Sri Lanka

Males

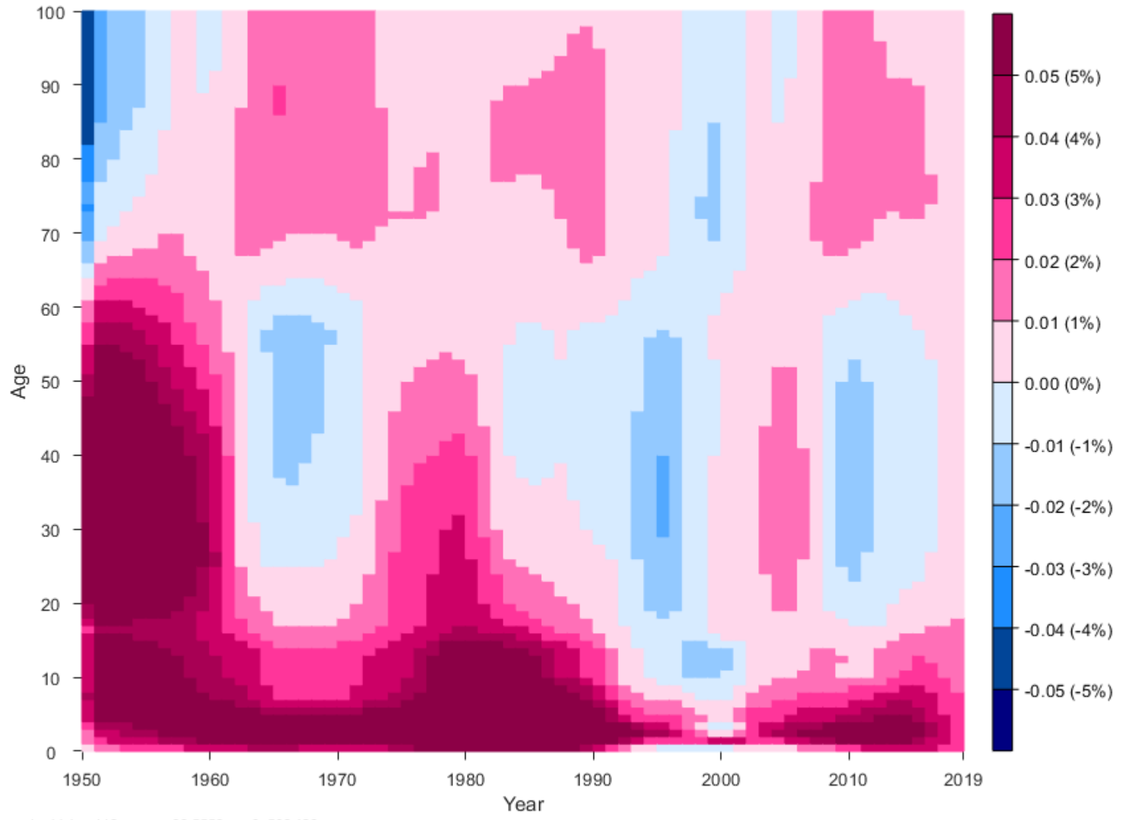


Females



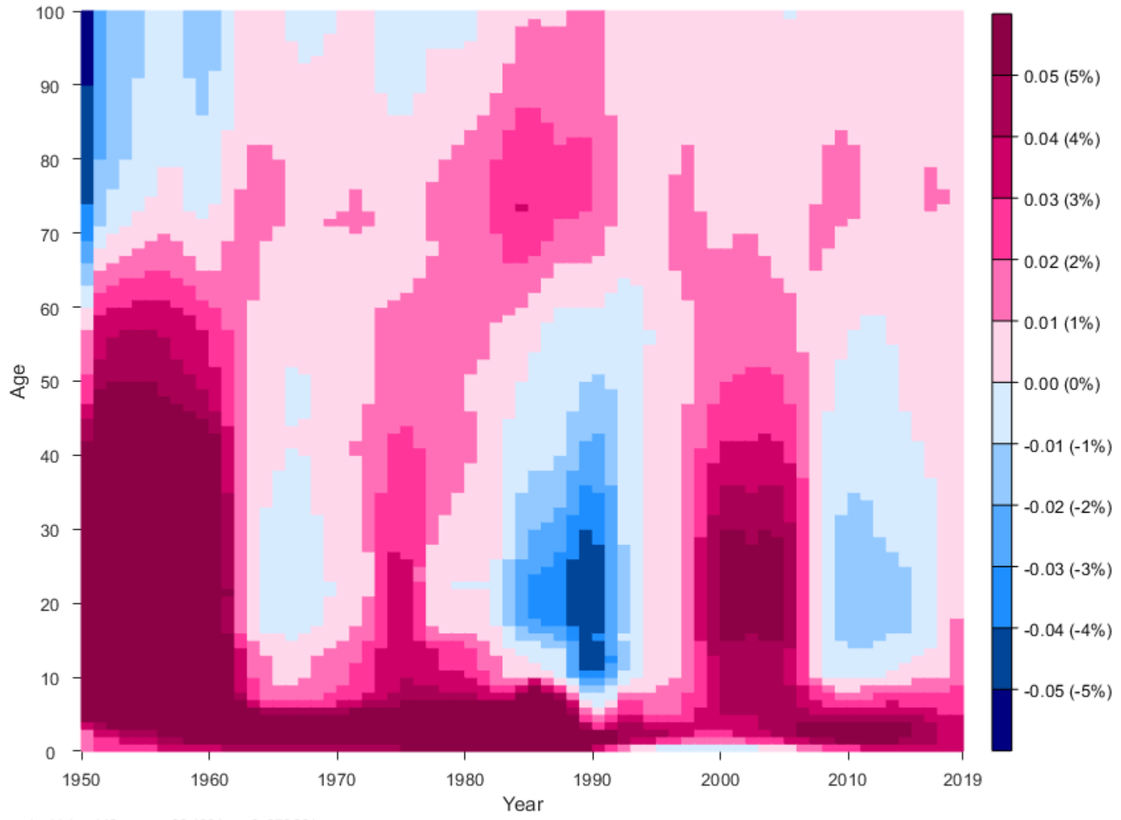
Saint Vincent and the Grenadines

Males



iters=1, nblobs=112, varprc=98.5559, var0=508.426

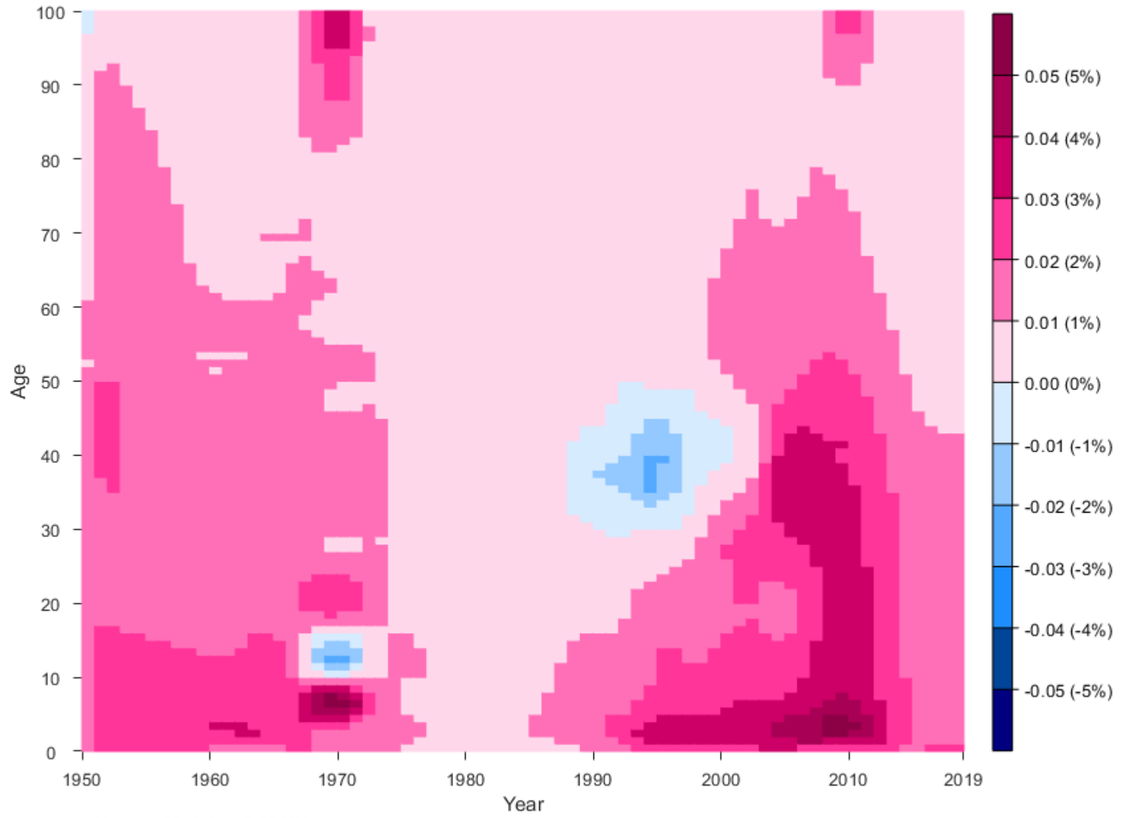
Females



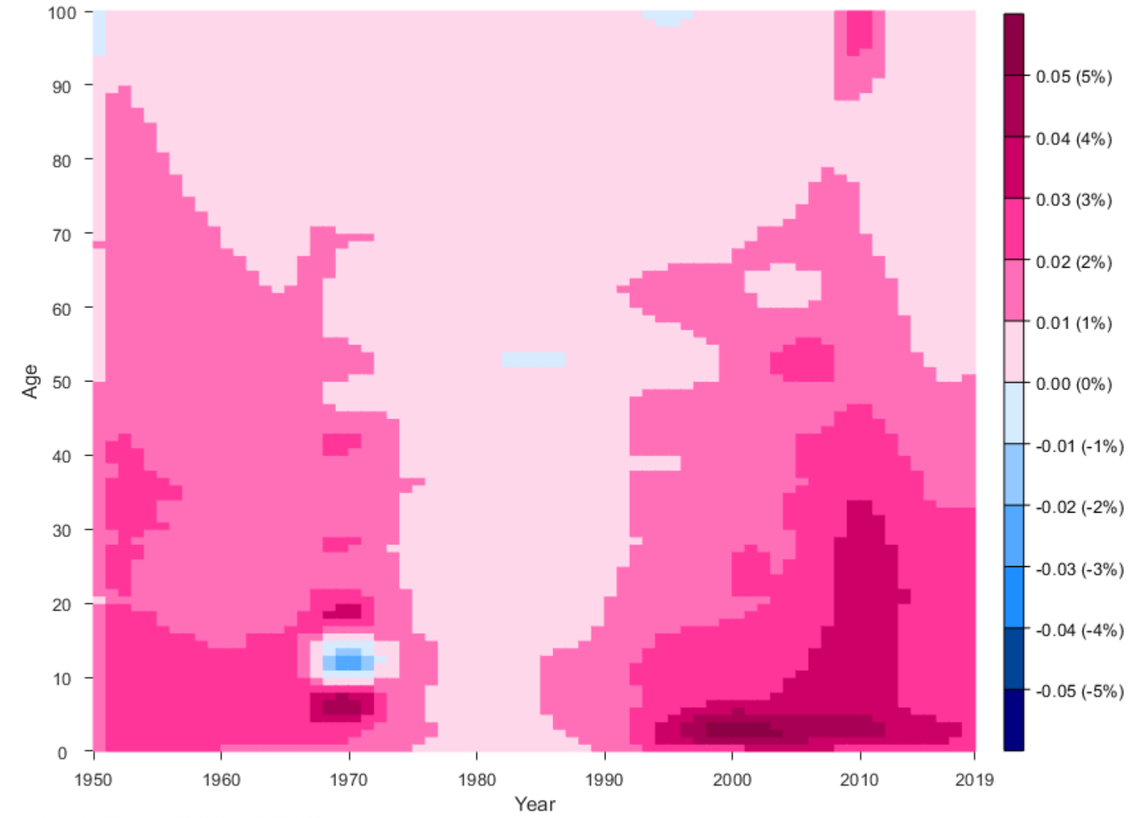
iters=1, nblobs=142, varprc=98.4994, var0=872.361

Sudan

Males

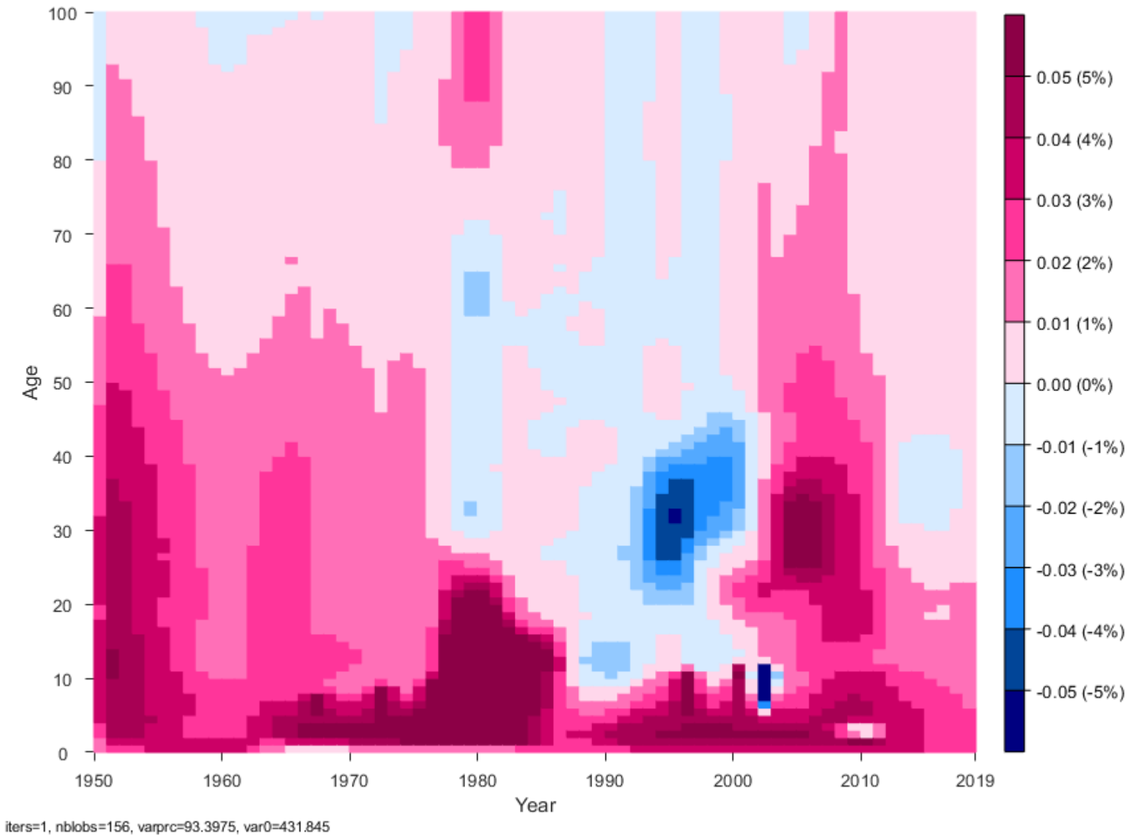


Females

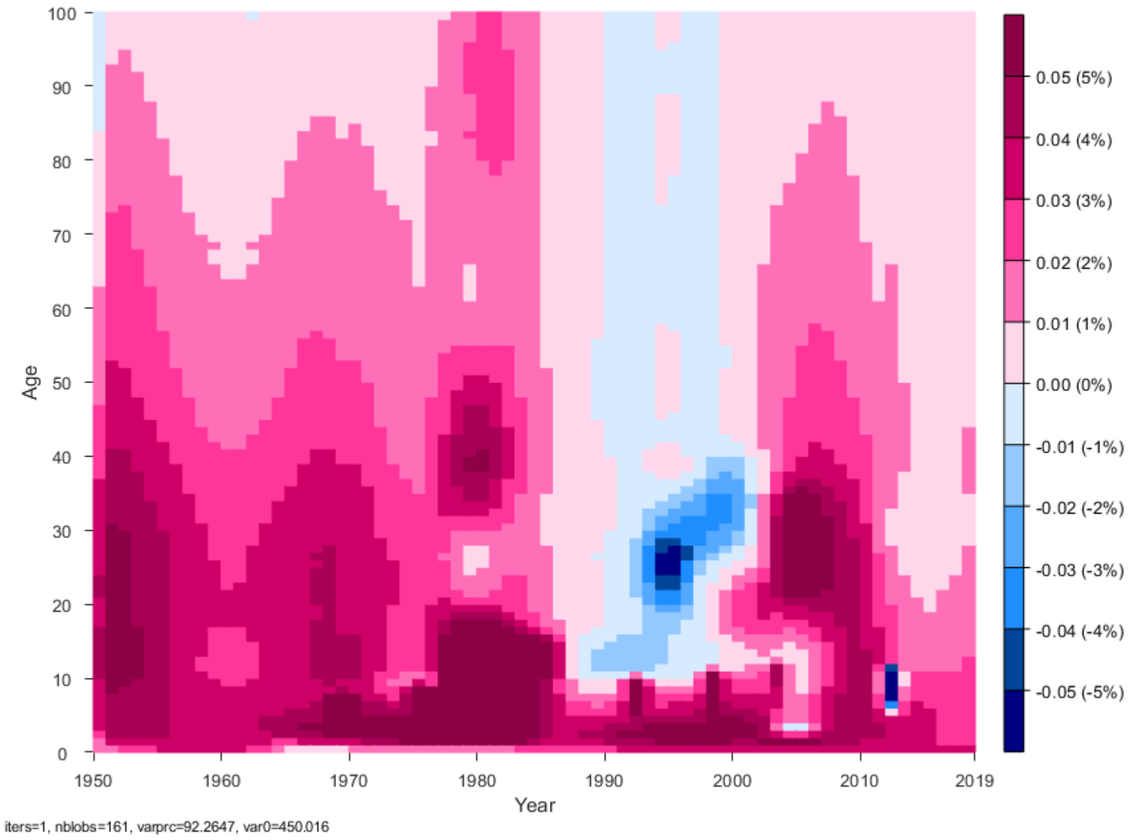


Suriname

Males

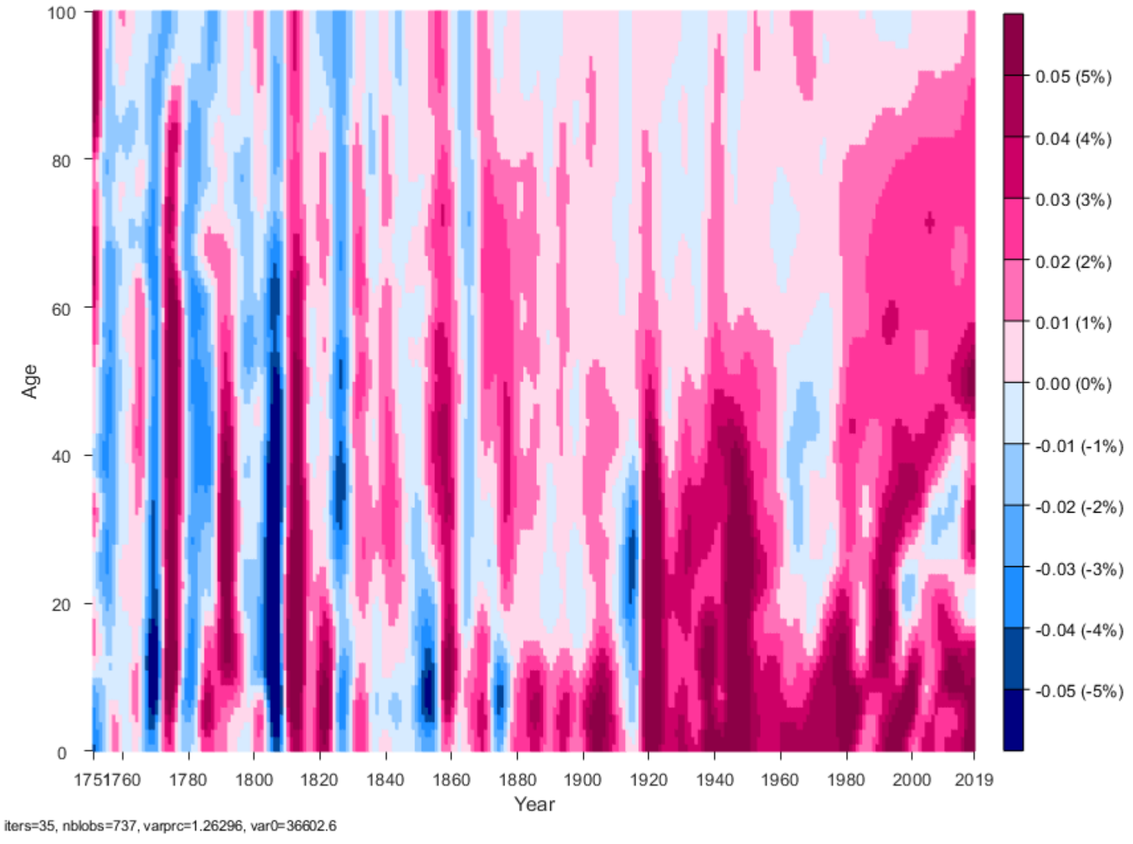


Females



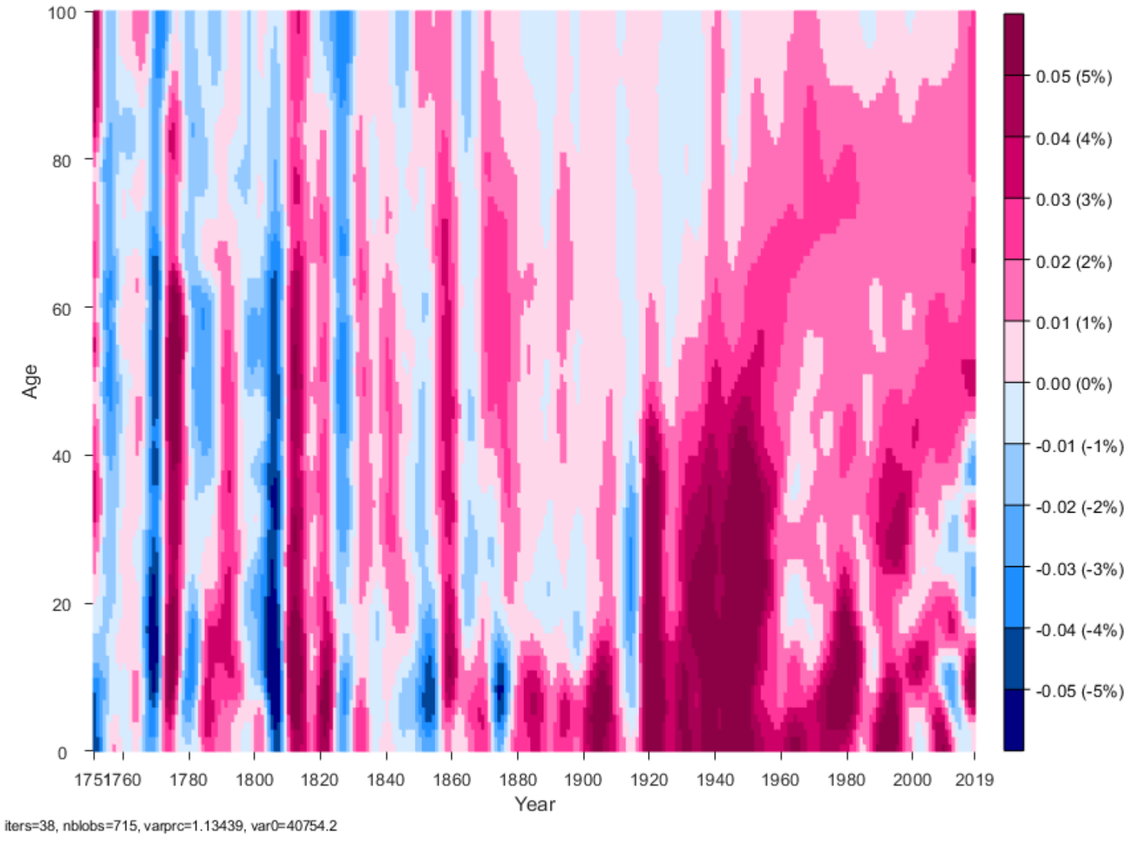
Sweden

Males



iters=35, nblobs=737, varprc=1.26296, var0=36602.6

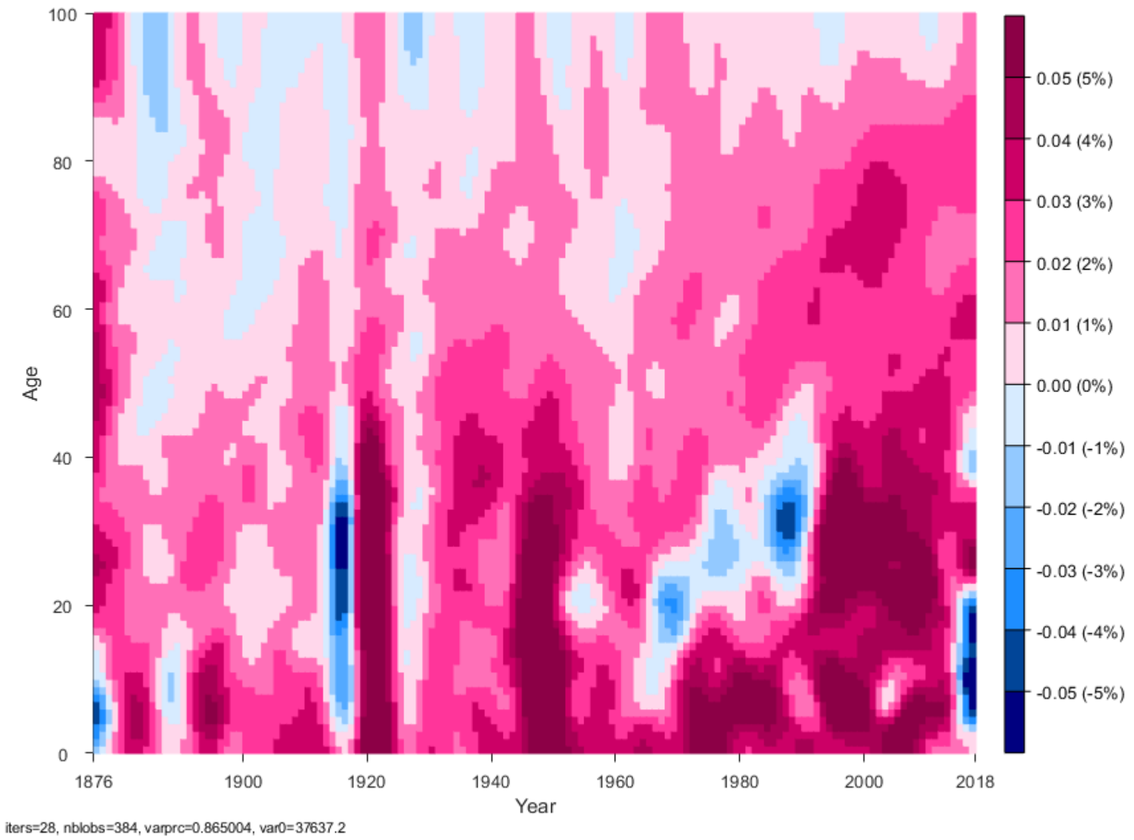
Females



iters=38, nblobs=715, varprc=1.13439, var0=40754.2

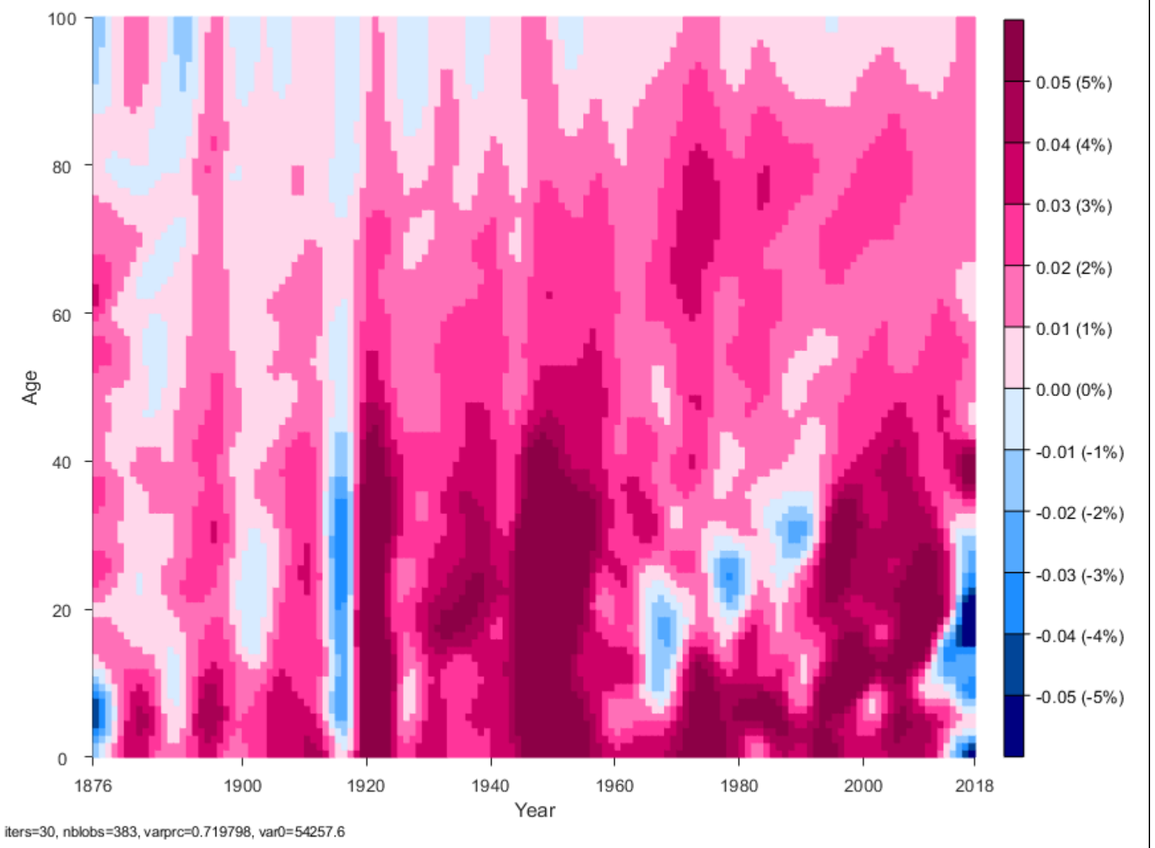
Switzerland

Males



iters=28, nblobs=384, varprc=0.865004, var0=37637.2

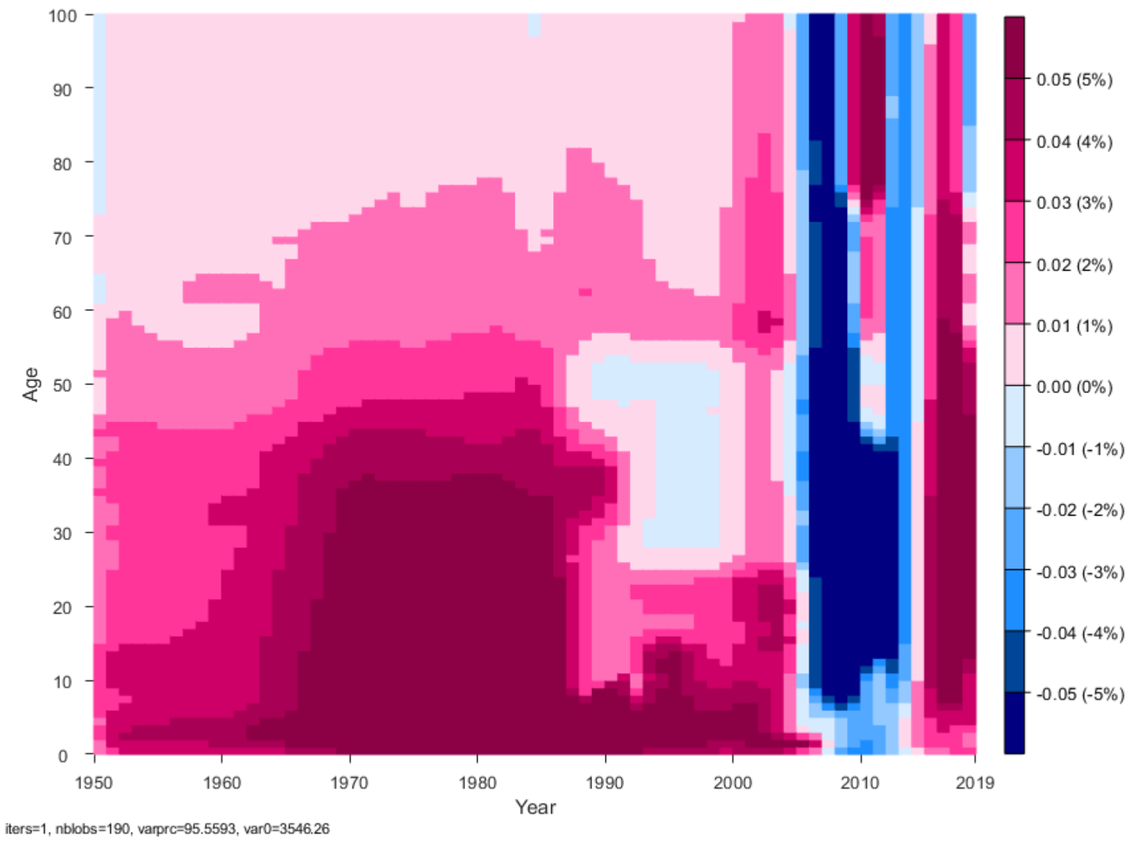
Females



iters=30, nblobs=383, varprc=0.719798, var0=54257.6

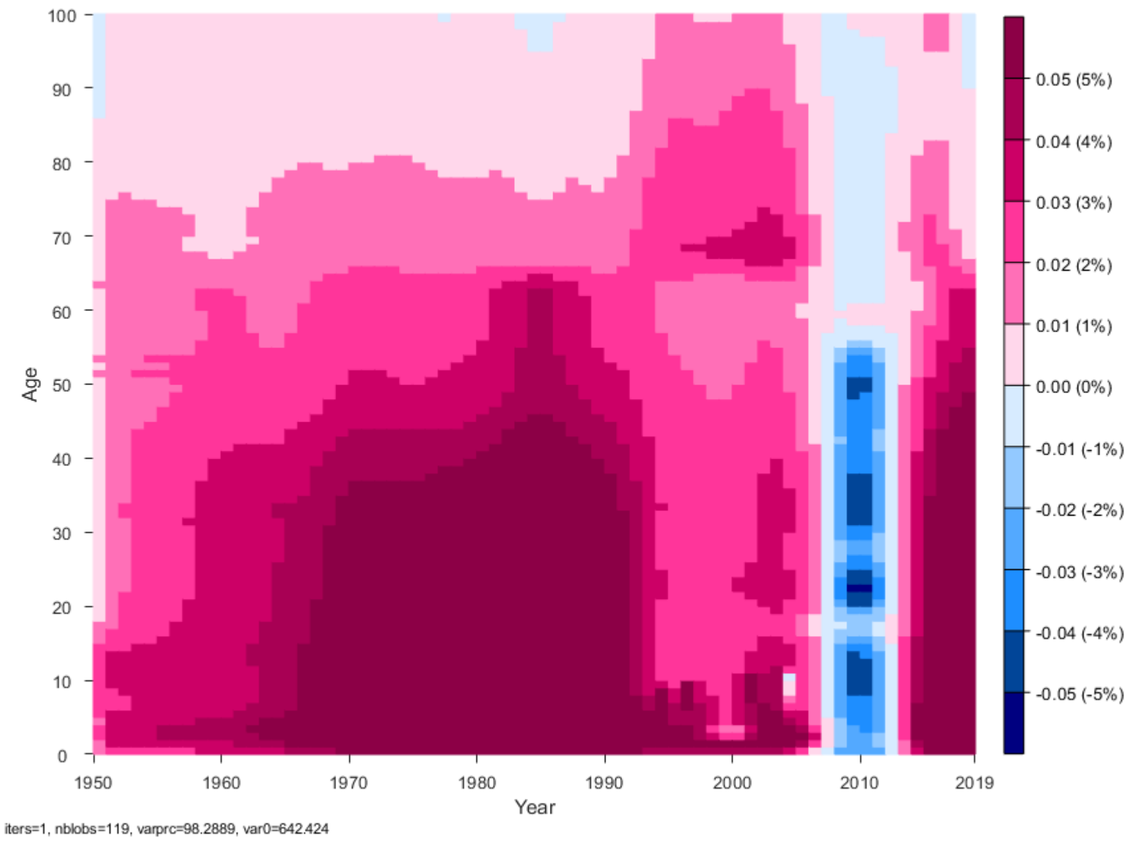
Syrian Arab Republic

Males



iters=1, nblobs=190, varprc=95.5593, var0=3546.26

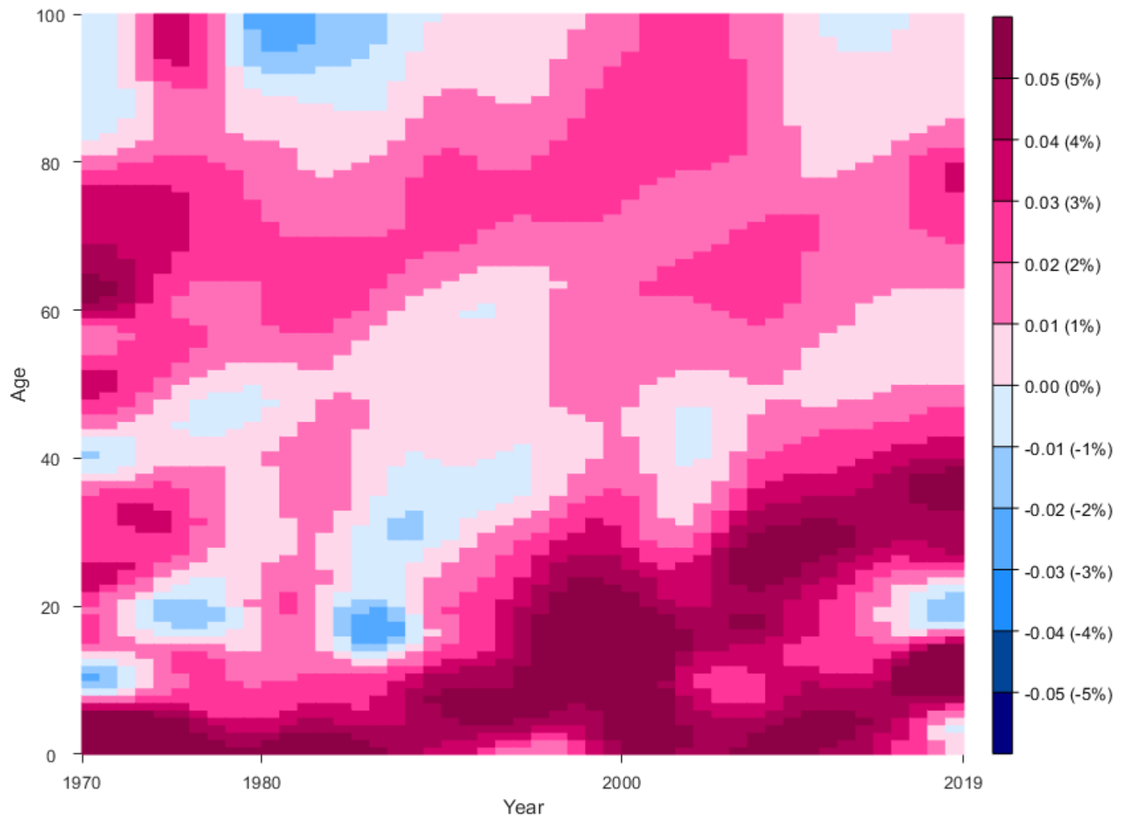
Females



iters=1, nblobs=119, varprc=98.2889, var0=642.424

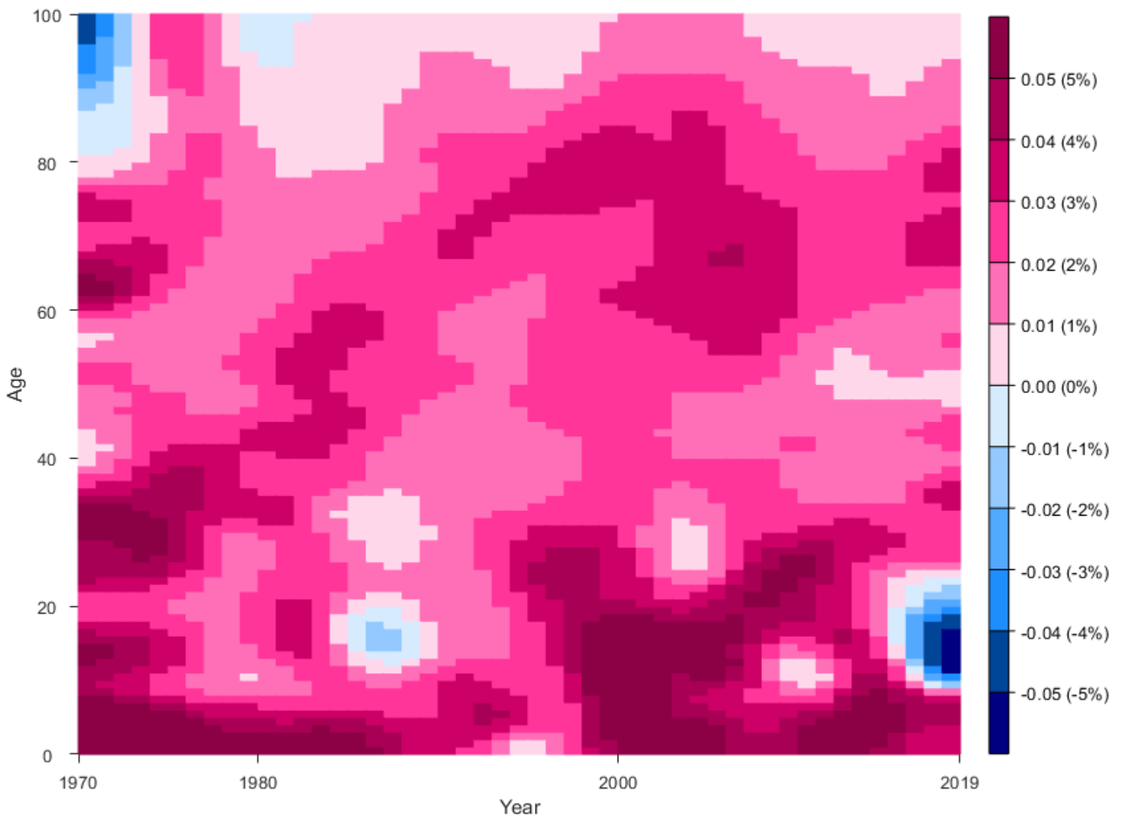
China, Taiwan Province of China

Males



iters=27, nblobs=127, varprc=2.49617, var0=12553.5

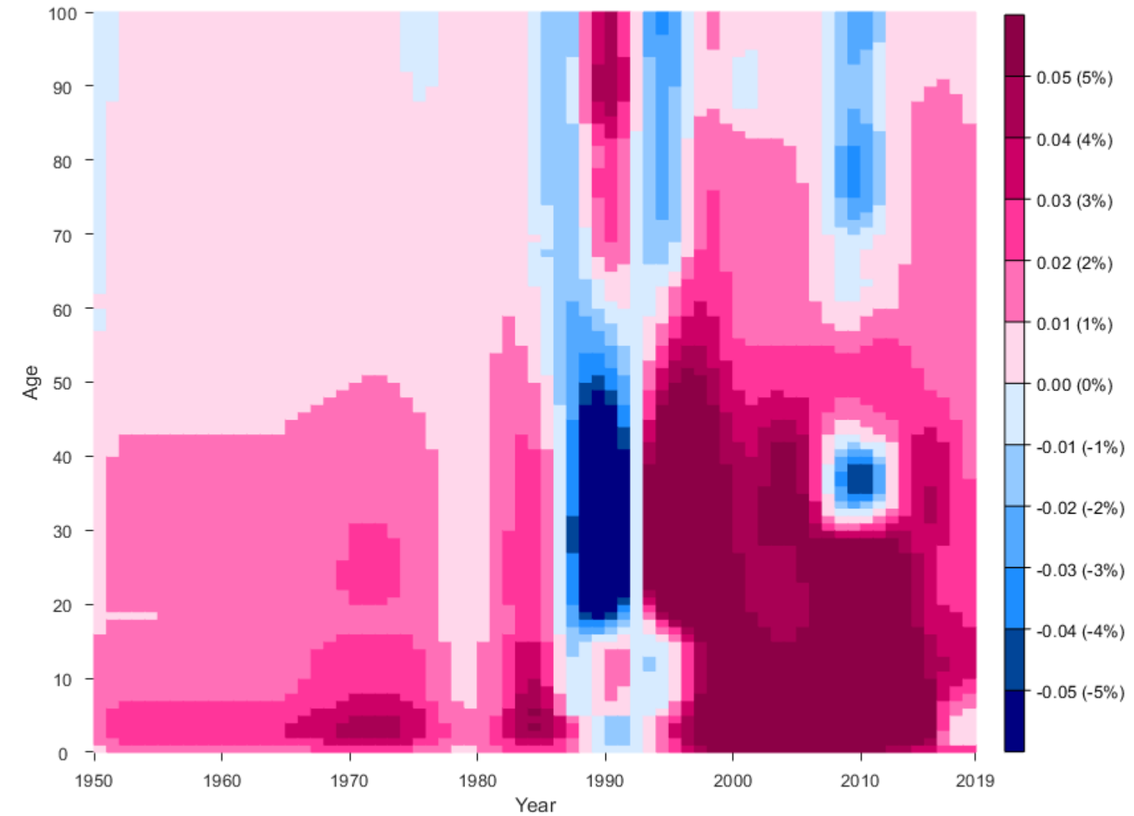
Females



iters=24, nblobs=134, varprc=1.15445, var0=19935.9

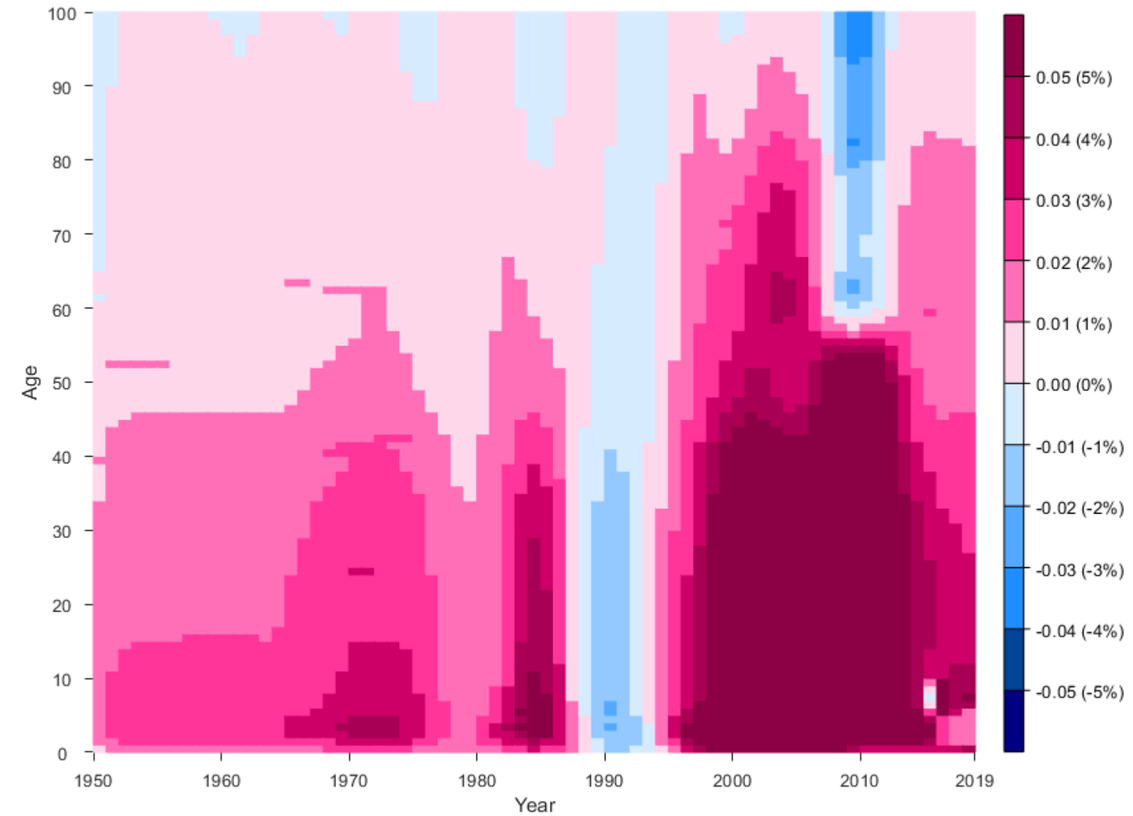
Tajikistan

Males



iters=2, nblobs=194, varprc=94.157, var0=1551.37

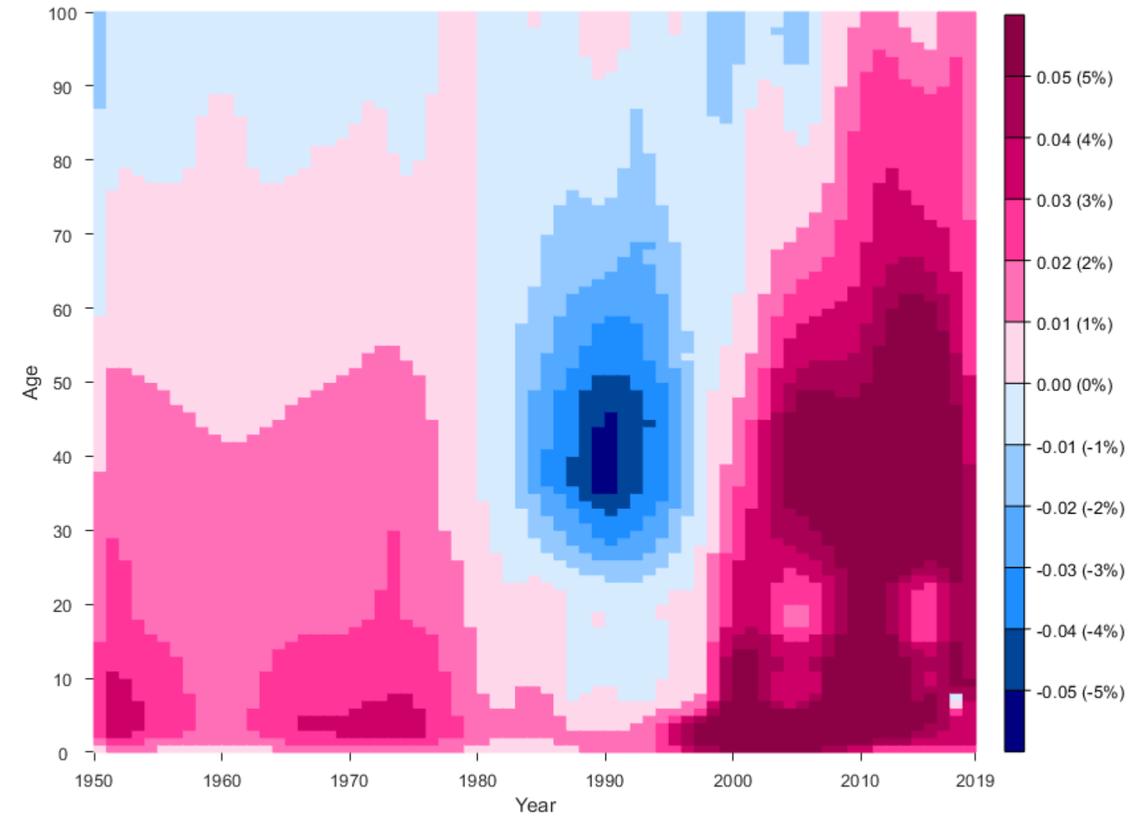
Females



iters=1, nblobs=103, varprc=97.8125, var0=1212.39

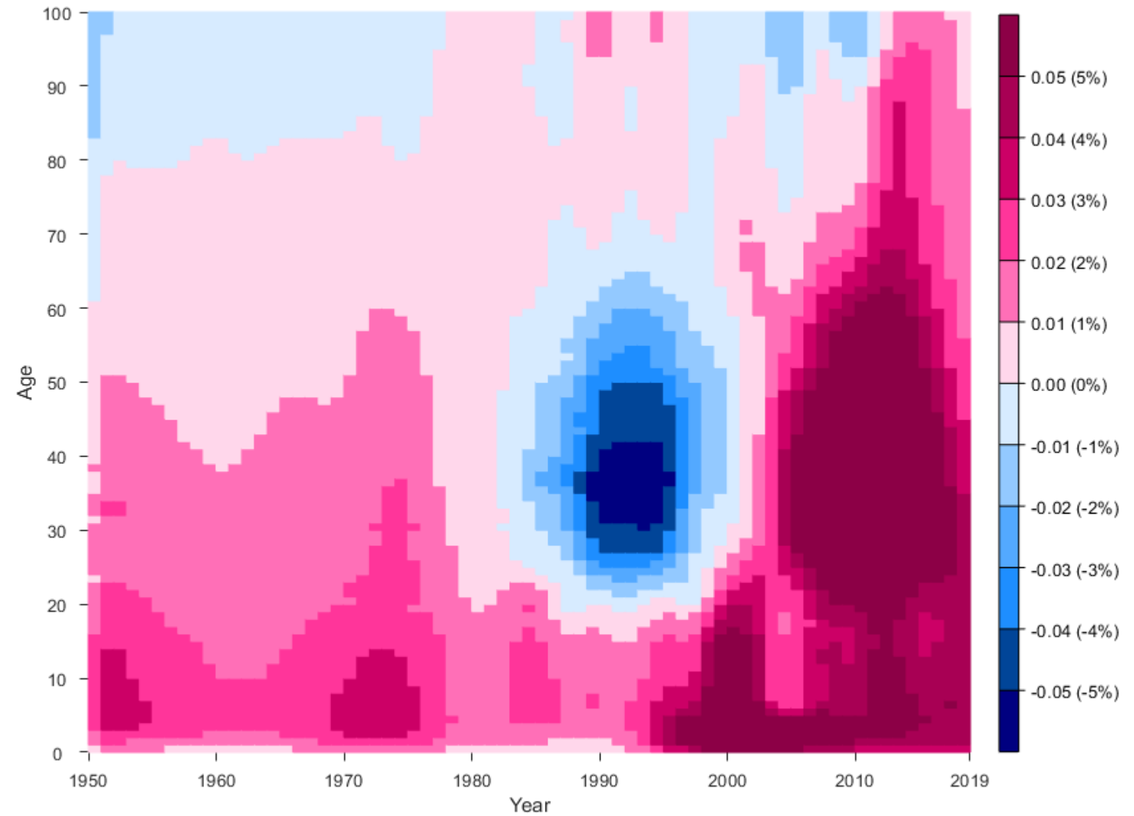
United Republic of Tanzania

Males



iters=1, nblobs=78, varprc=98.8724, var0=556.182

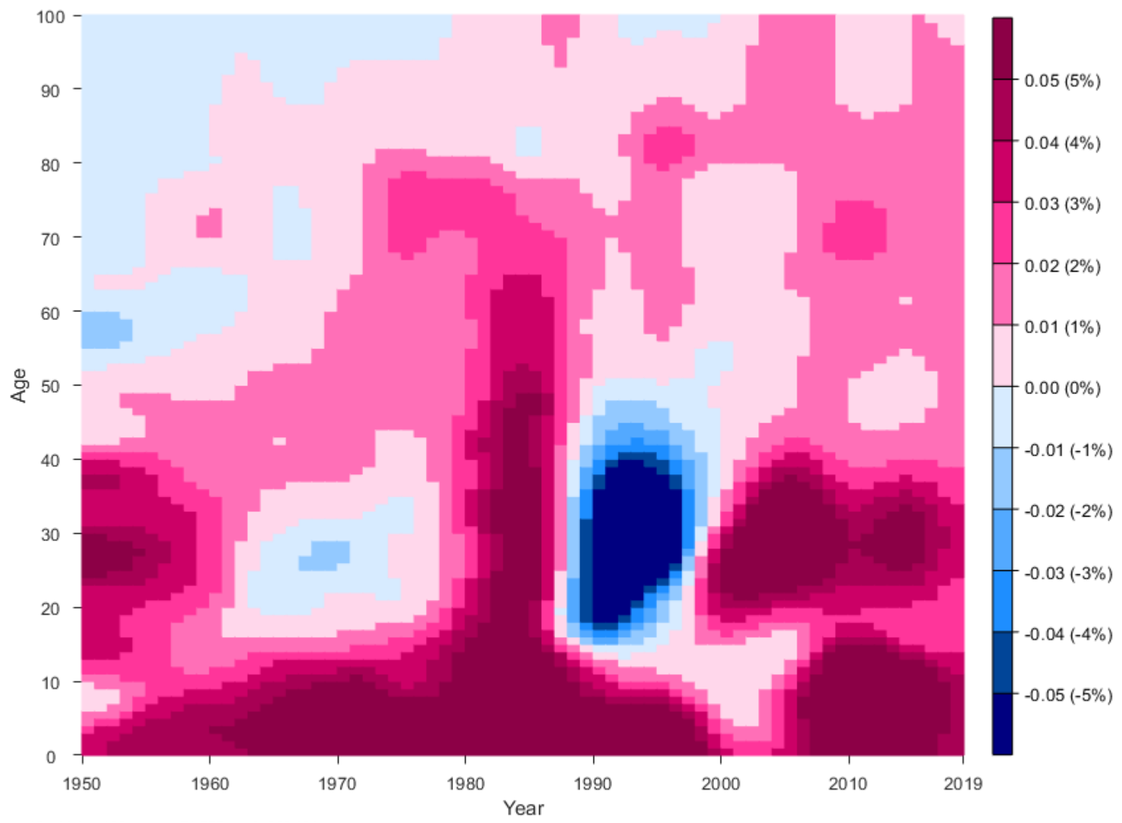
Females



iters=1, nblobs=102, varprc=99.099, var0=650.397

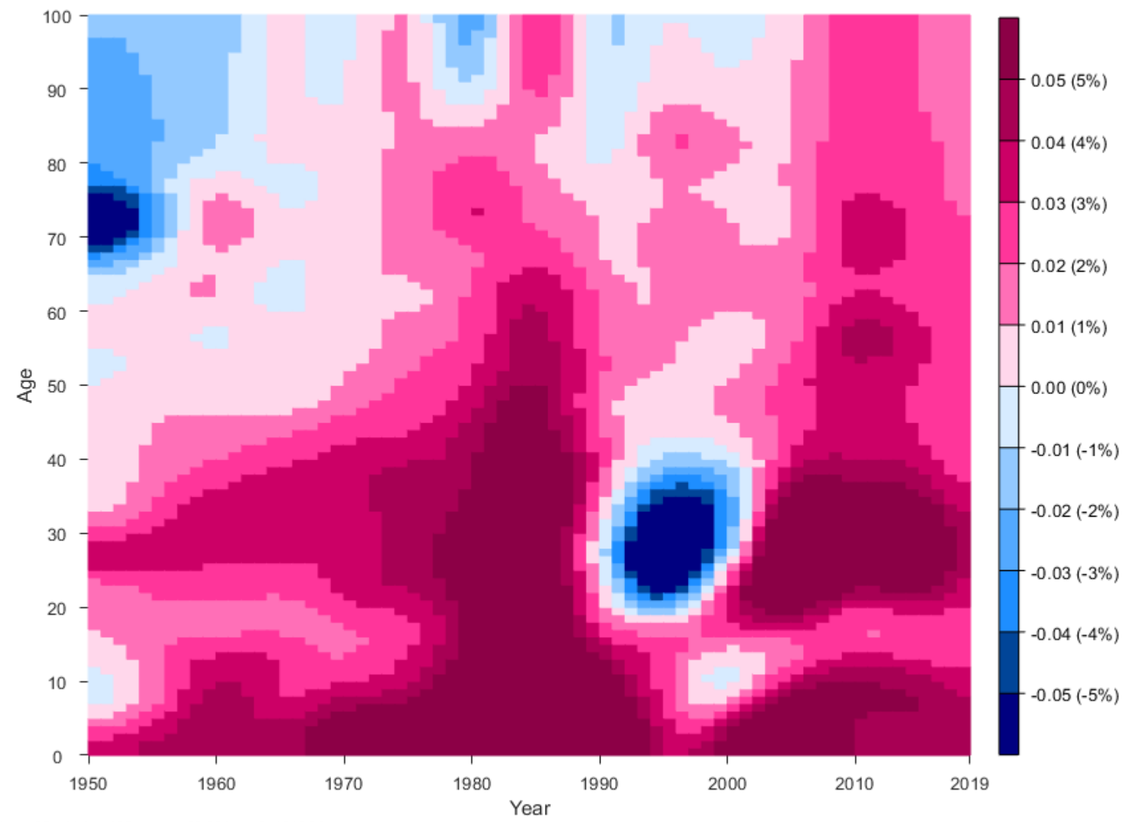
Thailand

Males



iters=19, nblobs=196, varprc=71.755, var0=868.424

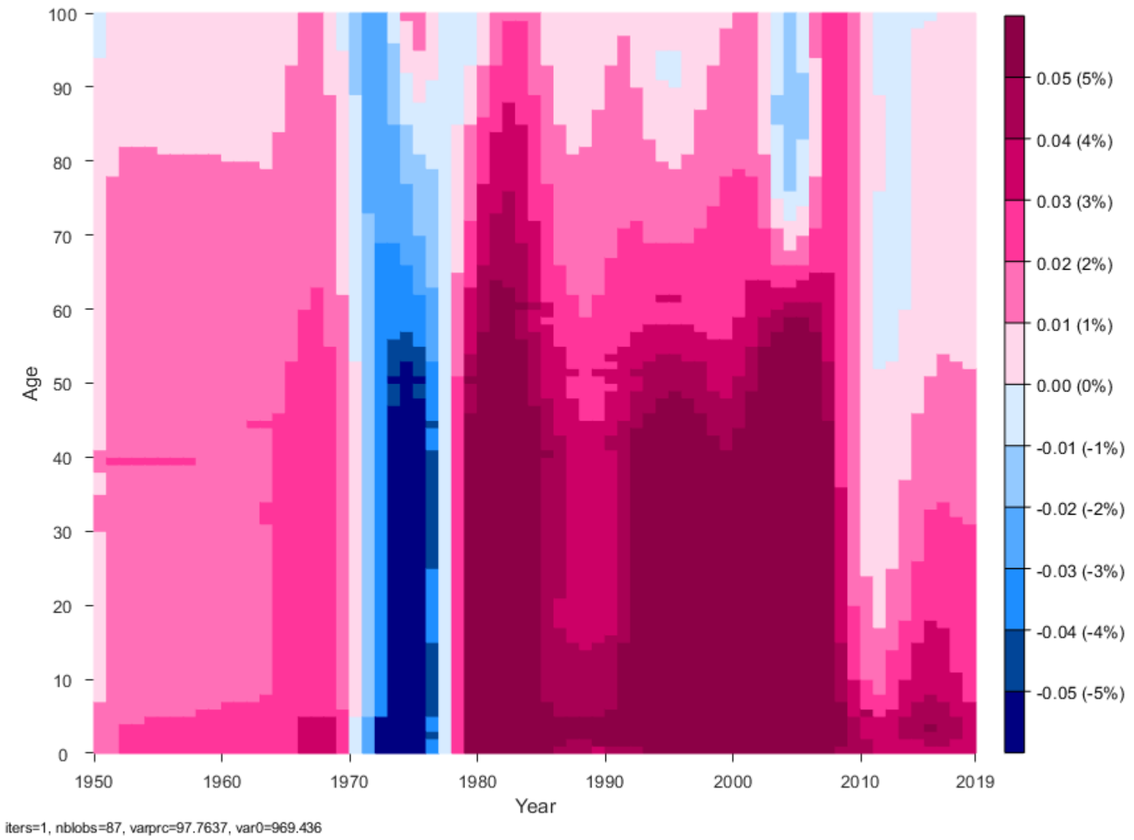
Females



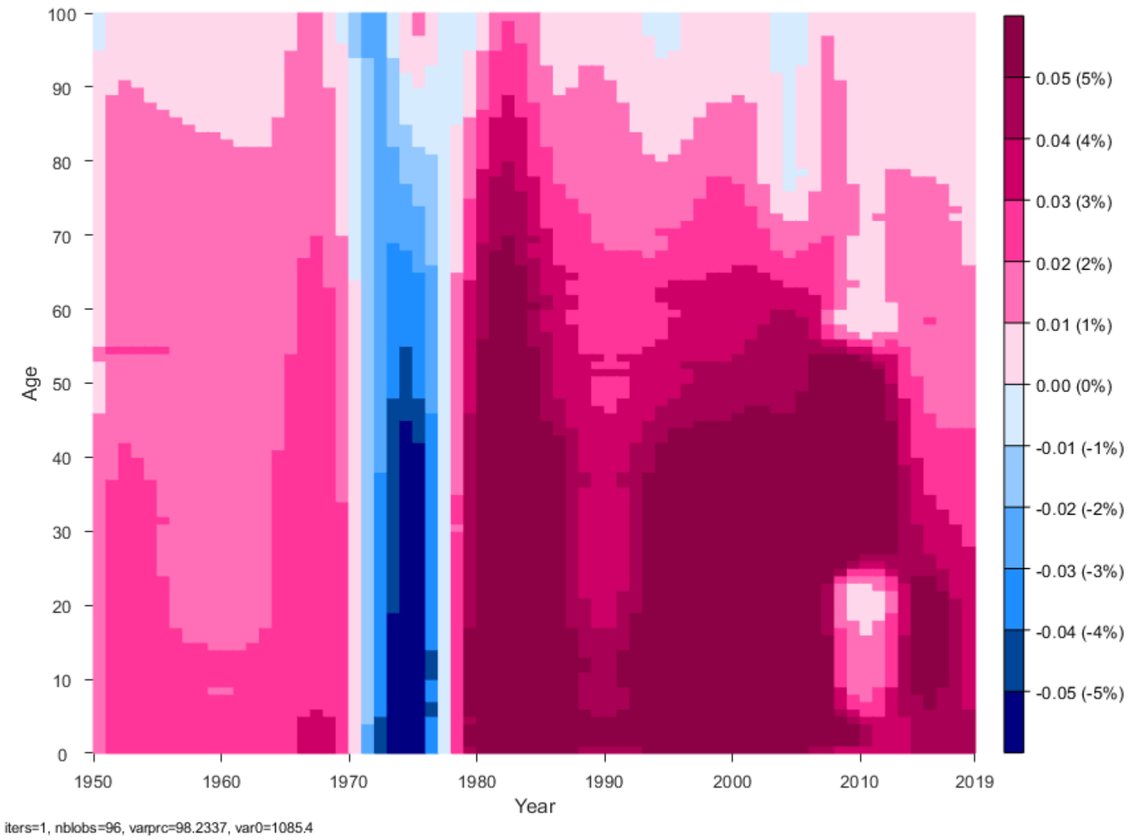
iters=25, nblobs=196, varprc=69.391, var0=1016.04

Timor-Leste

Males

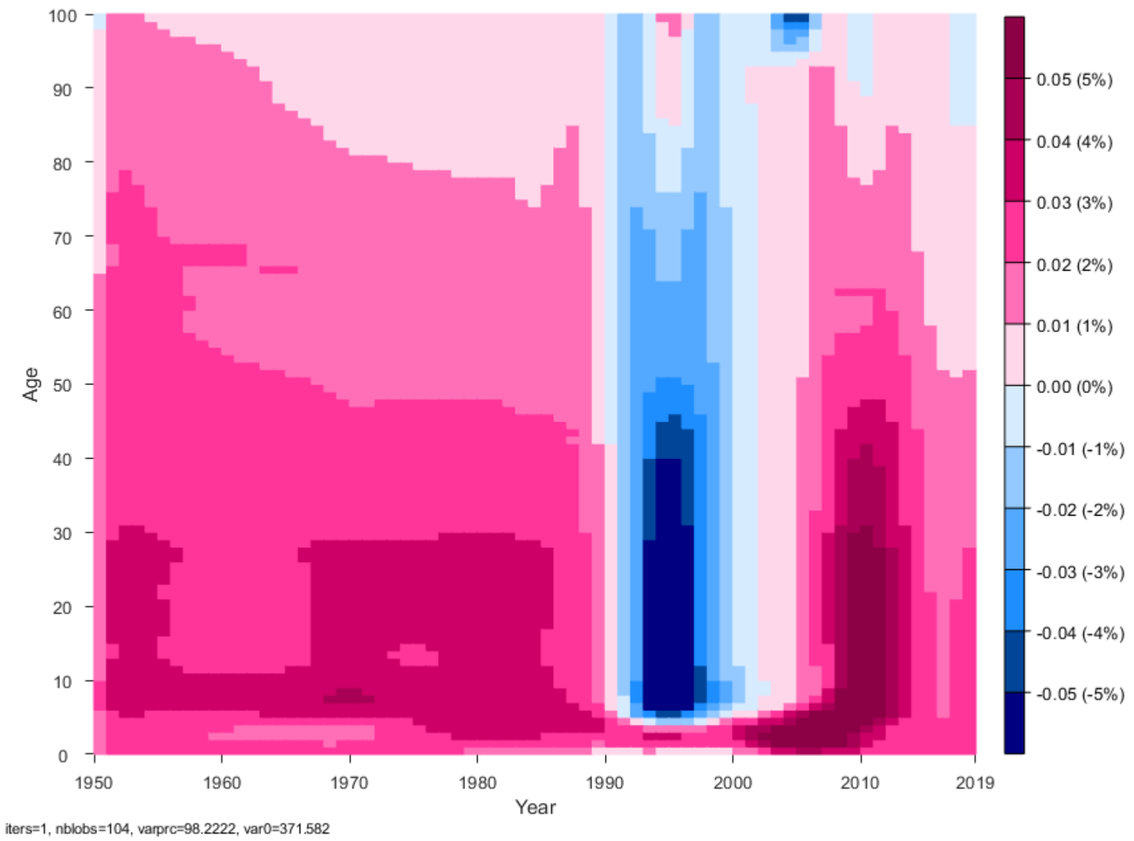


Females



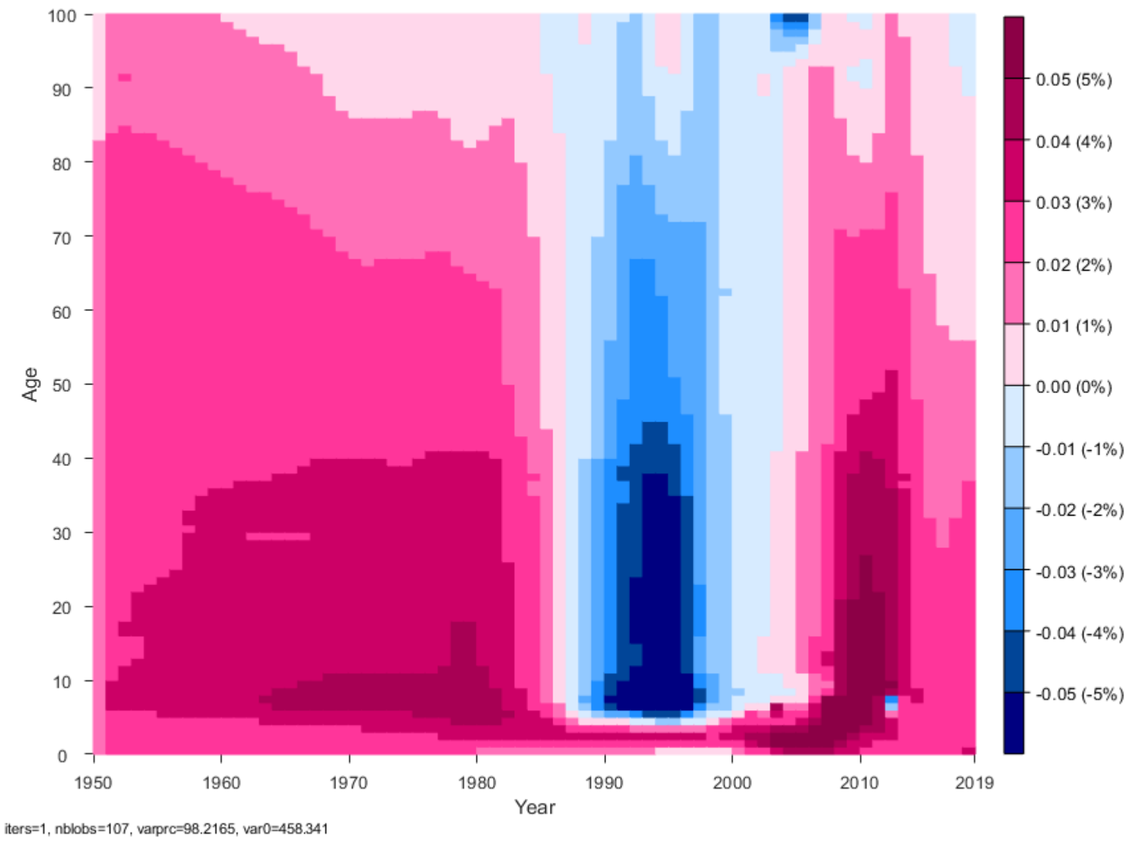
Togo

Males



iters=1, nblobs=104, varprc=98.2222, var0=371.582

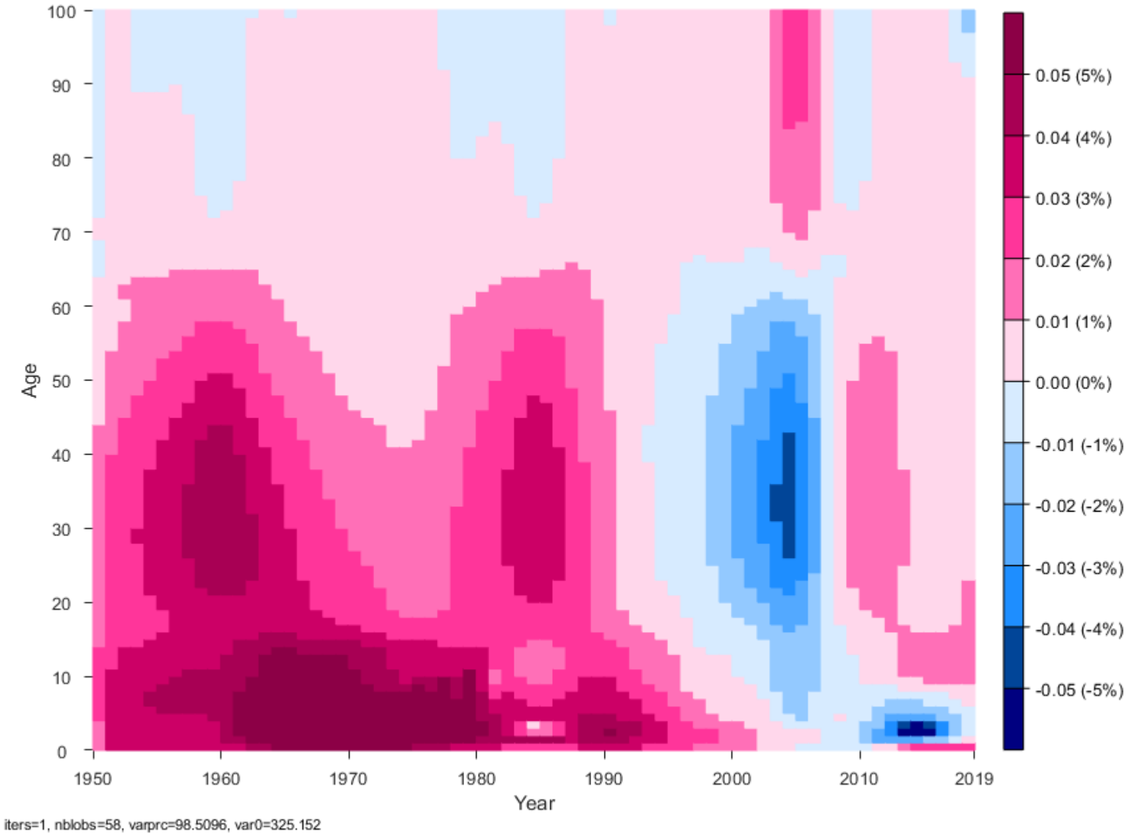
Females



iters=1, nblobs=107, varprc=98.2165, var0=458.341

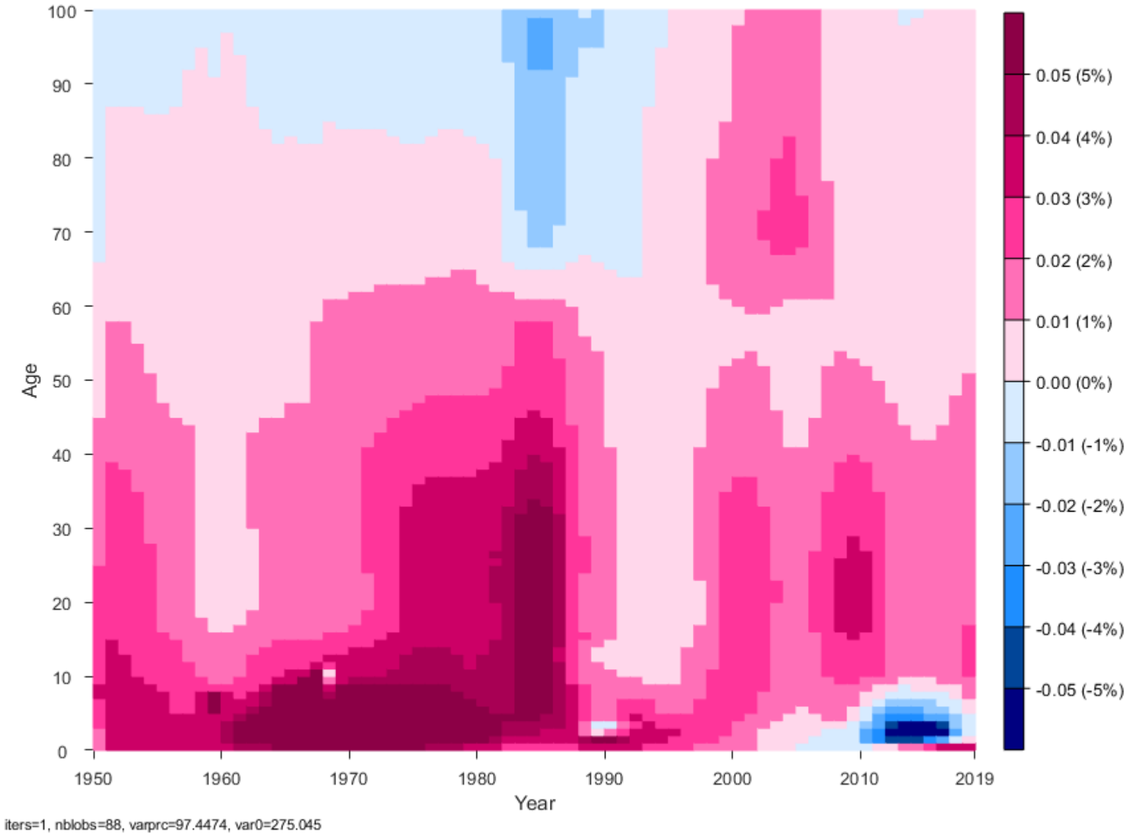
Tonga

Males



iters=1, nblobs=58, varprc=98.5096, var0=325.152

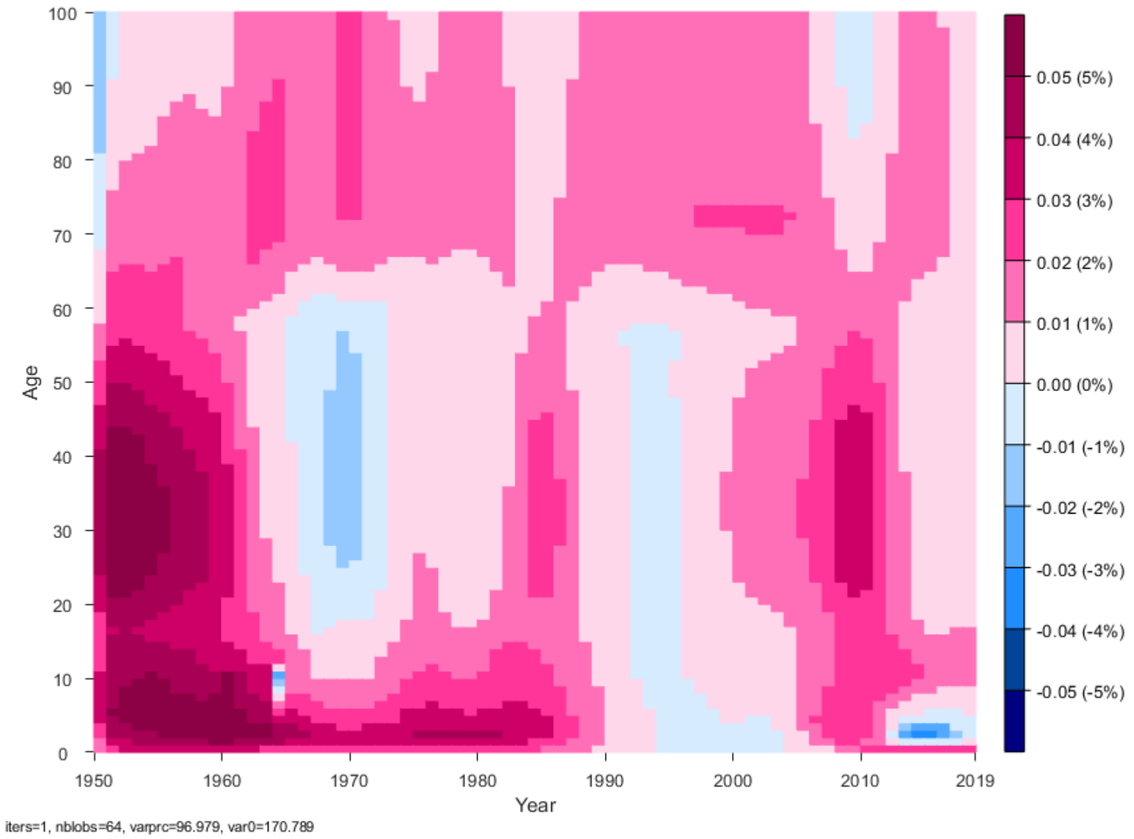
Females



iters=1, nblobs=88, varprc=97.4474, var0=275.045

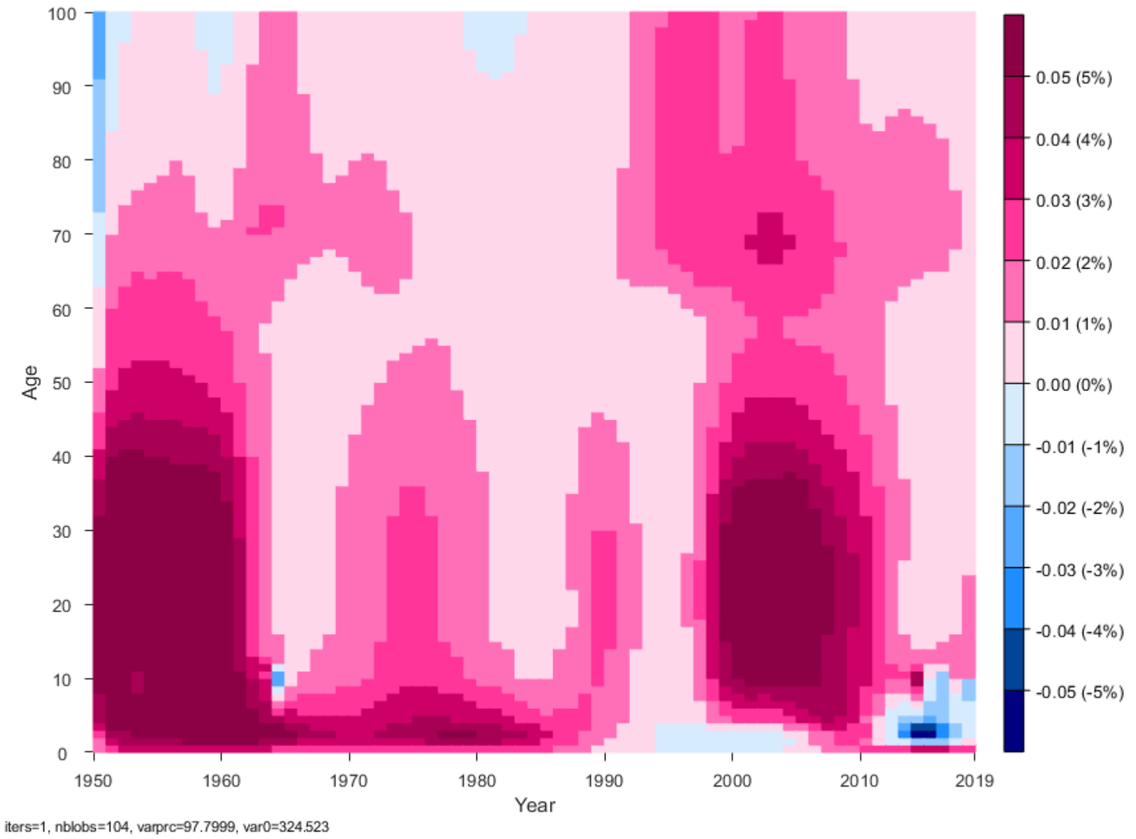
Trinidad and Tobago

Males



iters=1, nblobs=64, varprc=96.979, var0=170.789

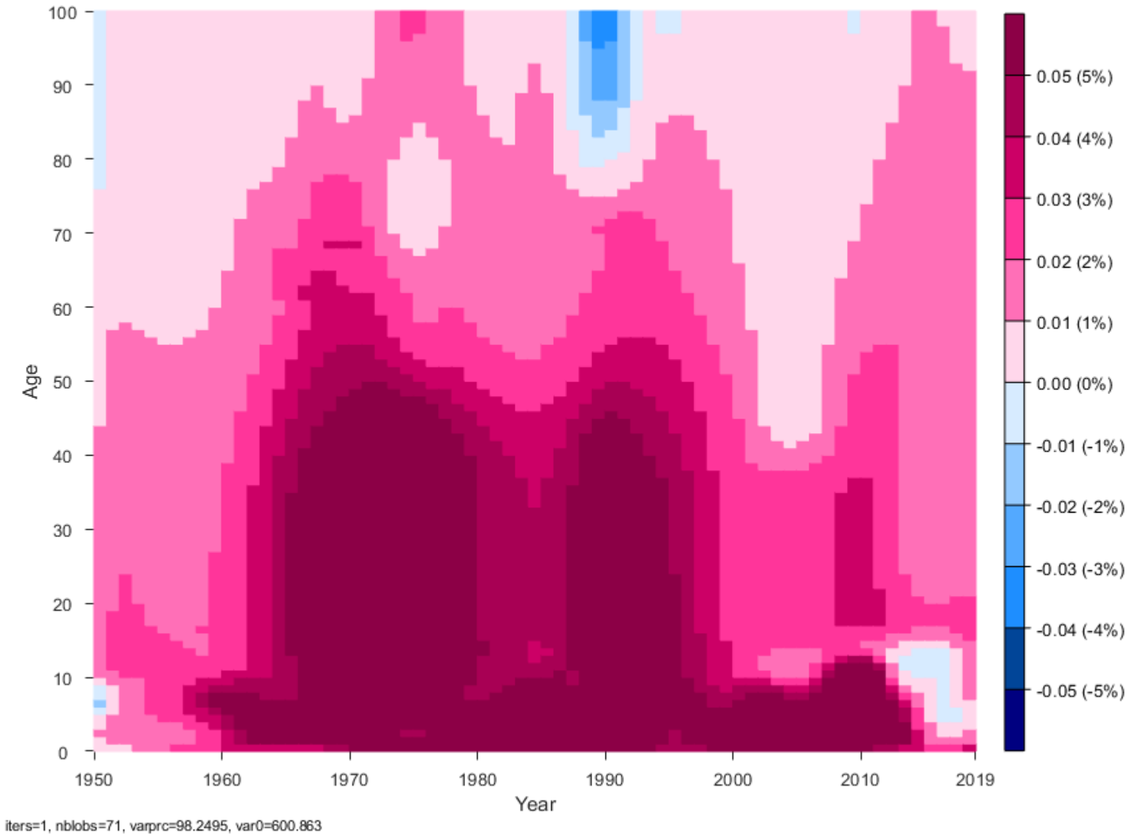
Females



iters=1, nblobs=104, varprc=97.7999, var0=324.523

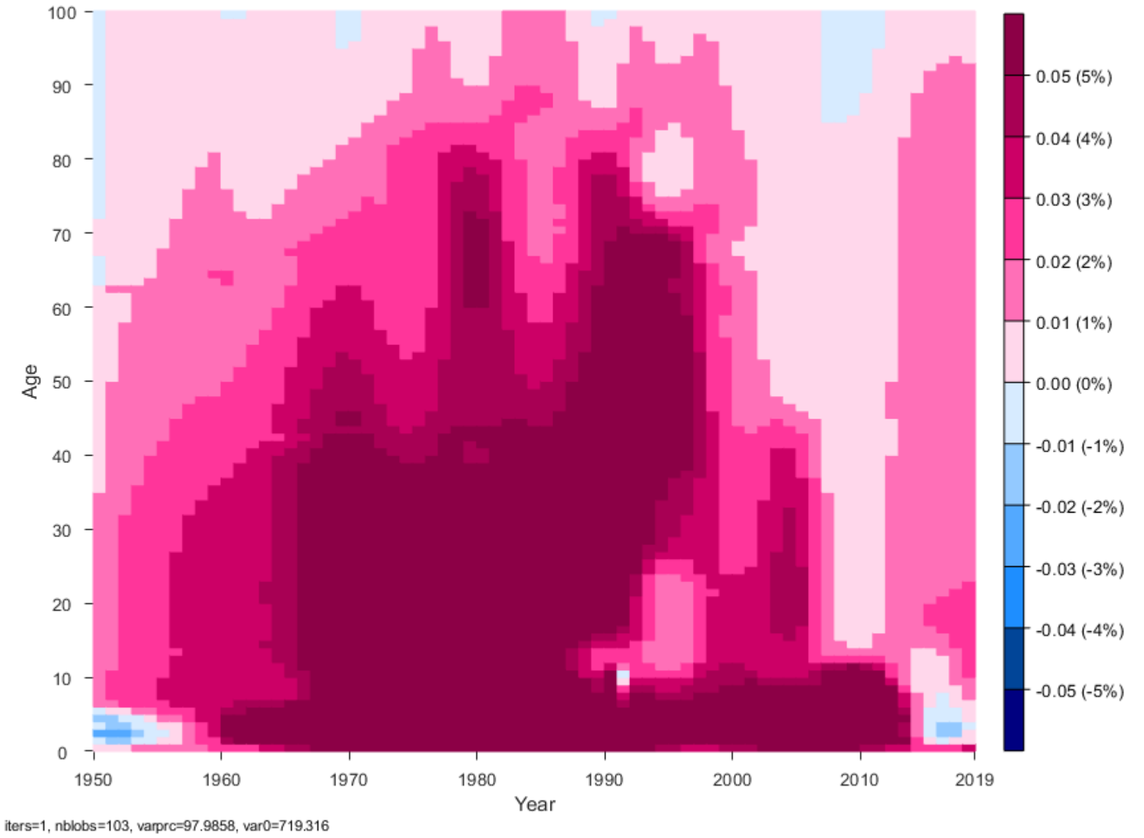
Tunisia

Males



iters=1, nblobs=71, varprc=98.2495, var0=600.863

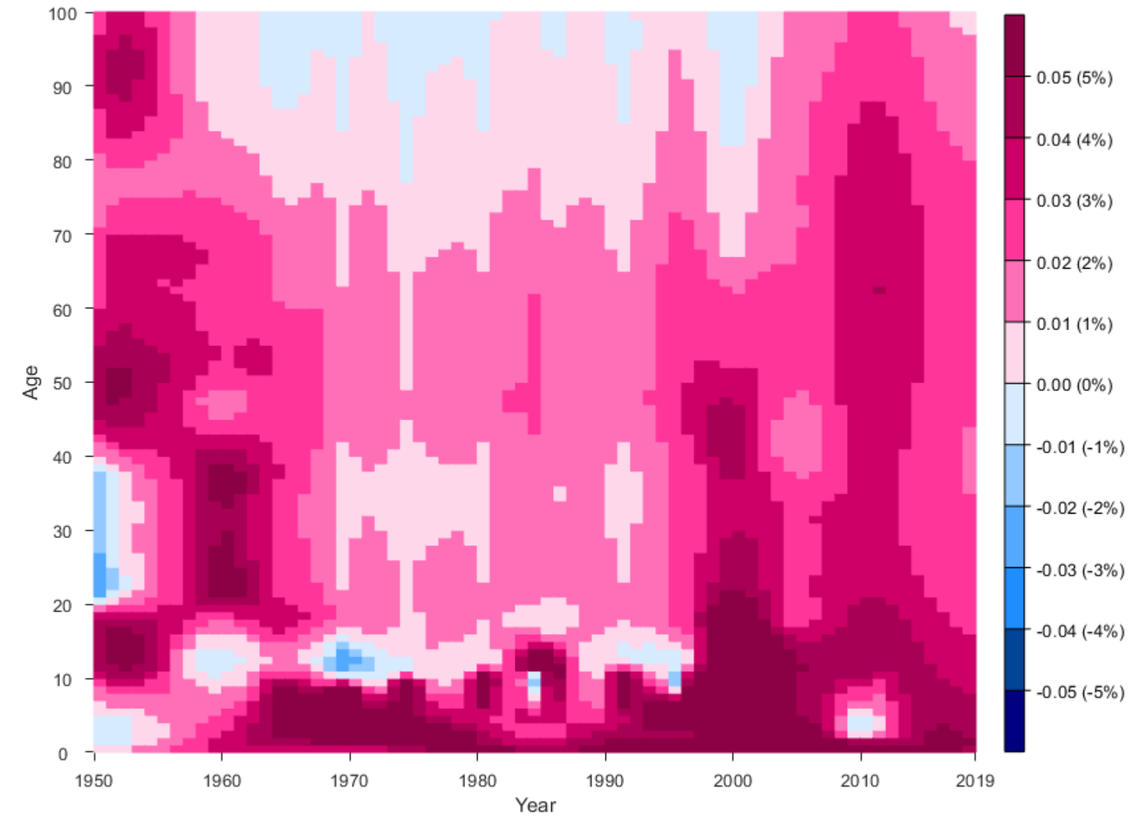
Females



iters=1, nblobs=103, varprc=97.9858, var0=719.316

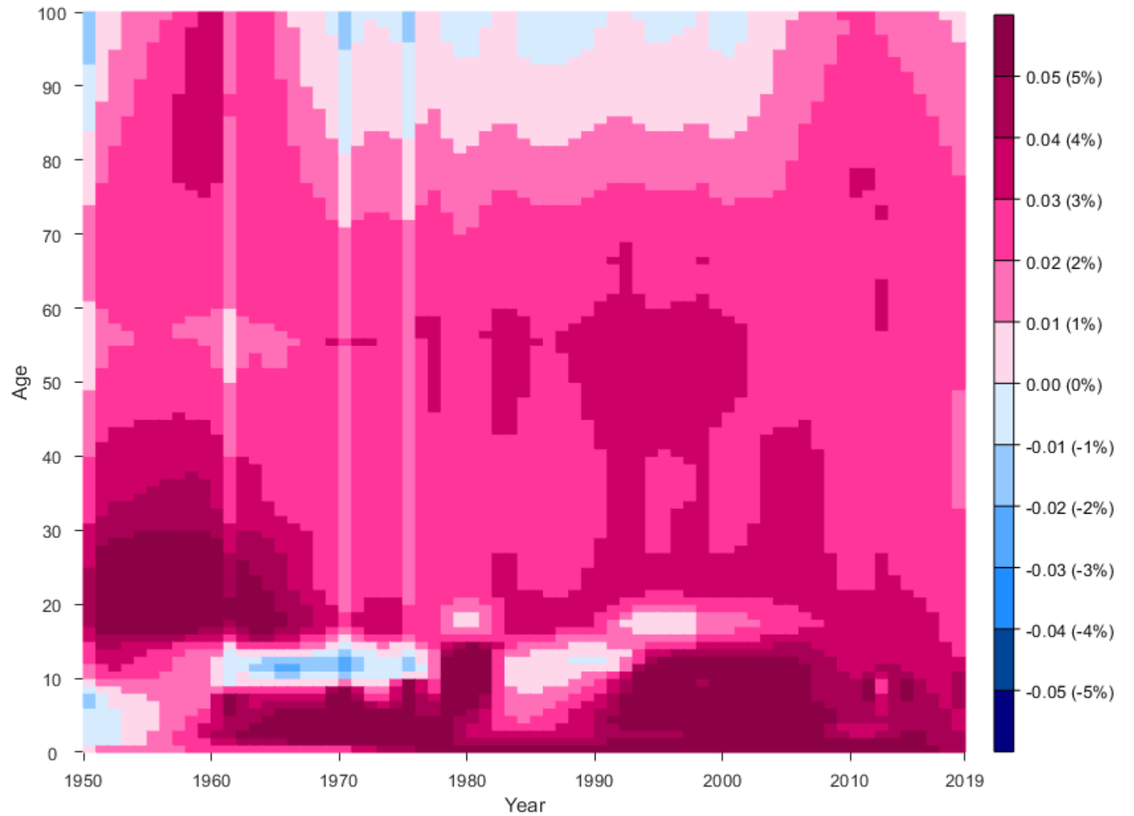
Turkey

Males



iters=3, nblobs=187, varprc=80.884, var0=386.817

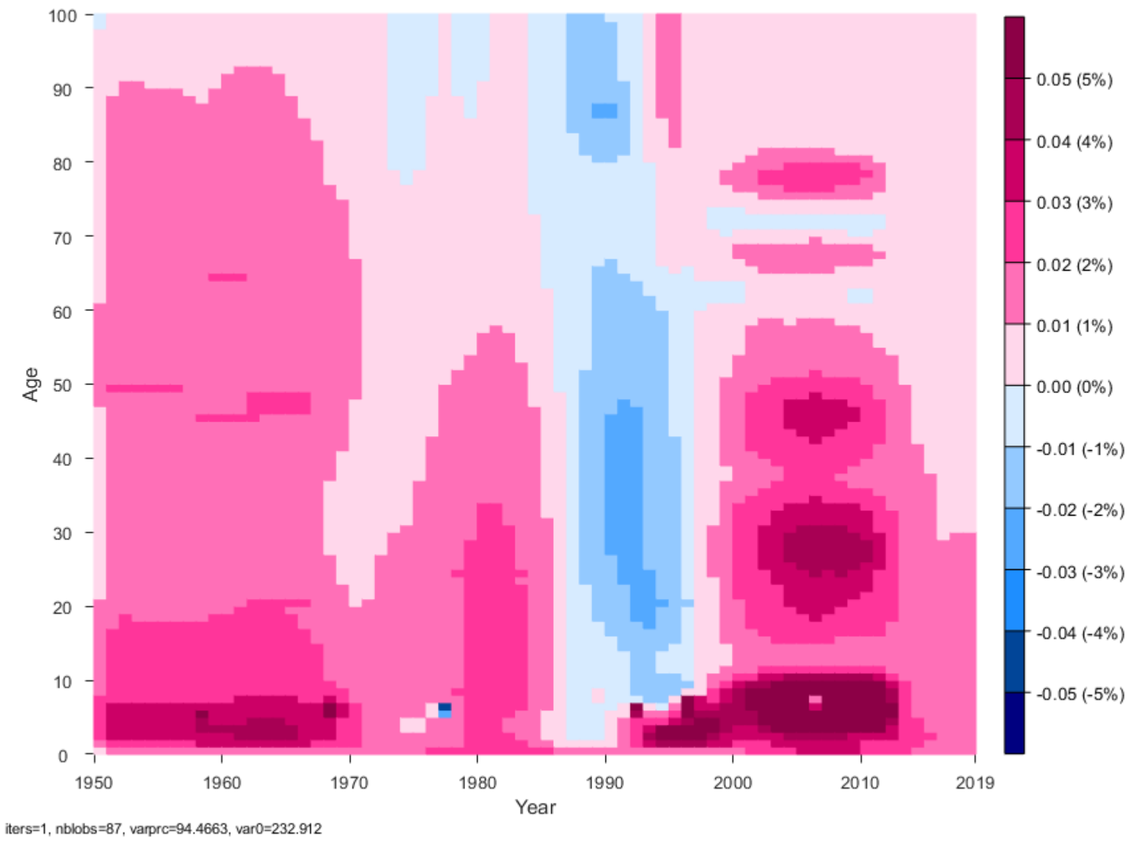
Females



iters=1, nblobs=196, varprc=90.4389, var0=275.128

Turkmenistan

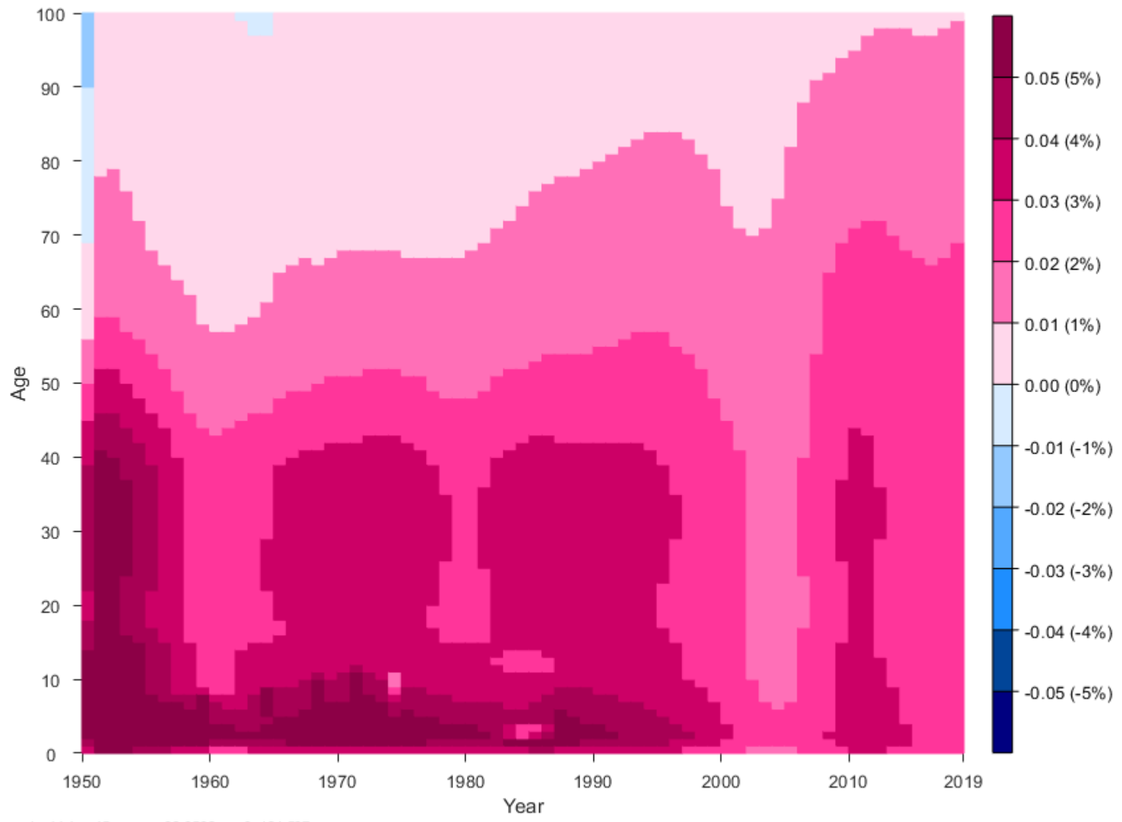
Males



Females

United States Virgin Islands

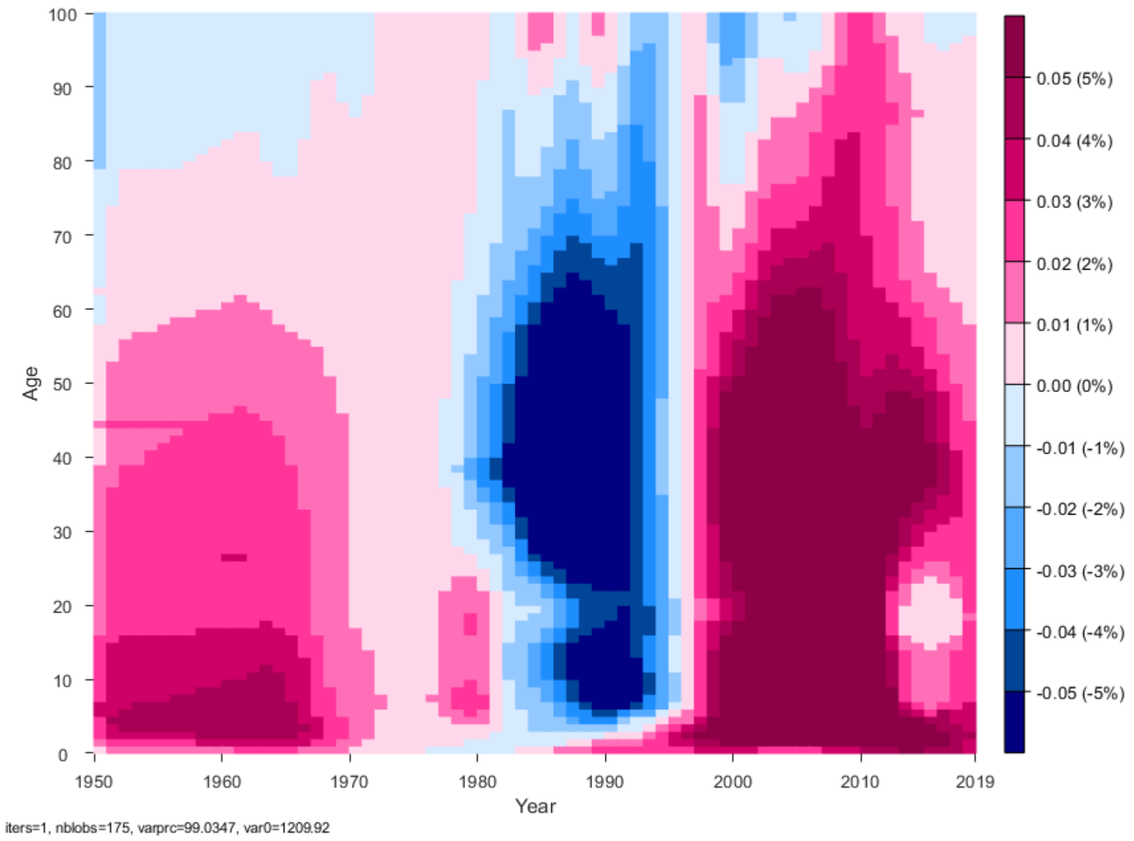
Males



Females

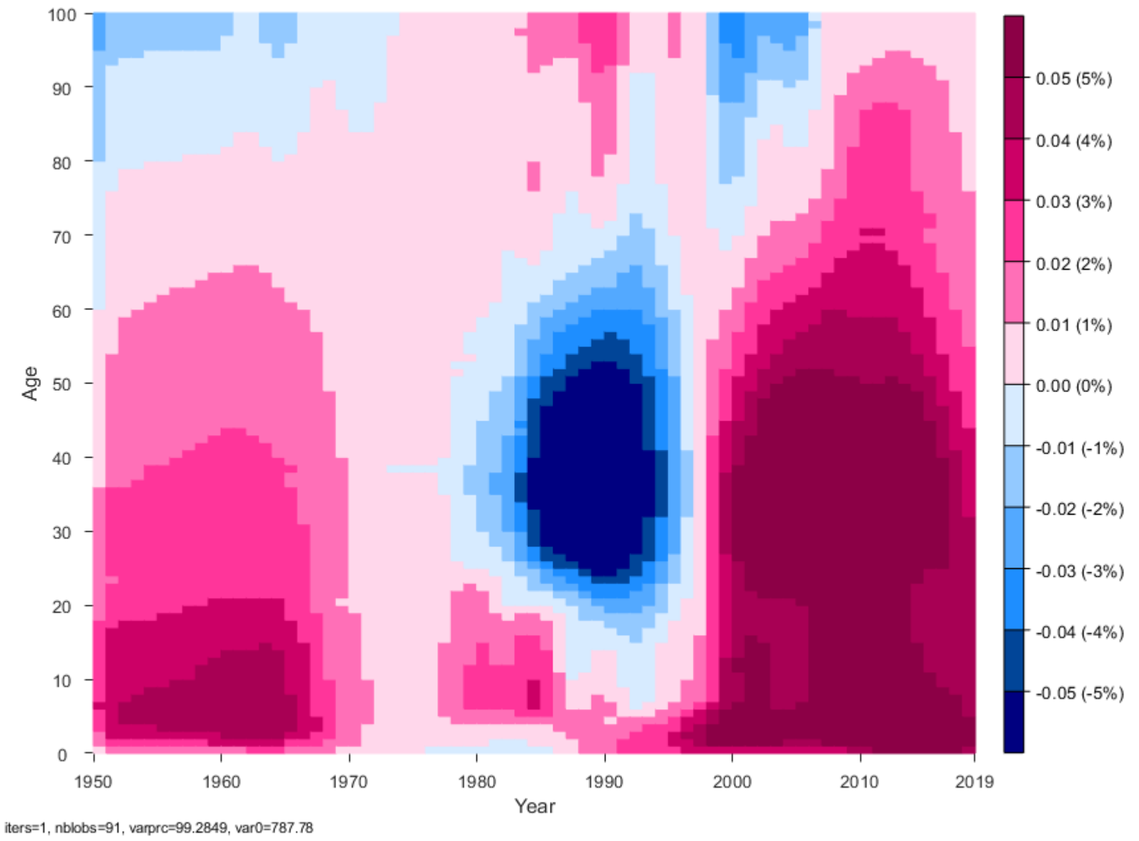
Uganda

Males



iters=1, nblobs=175, varprc=99.0347, var0=1209.92

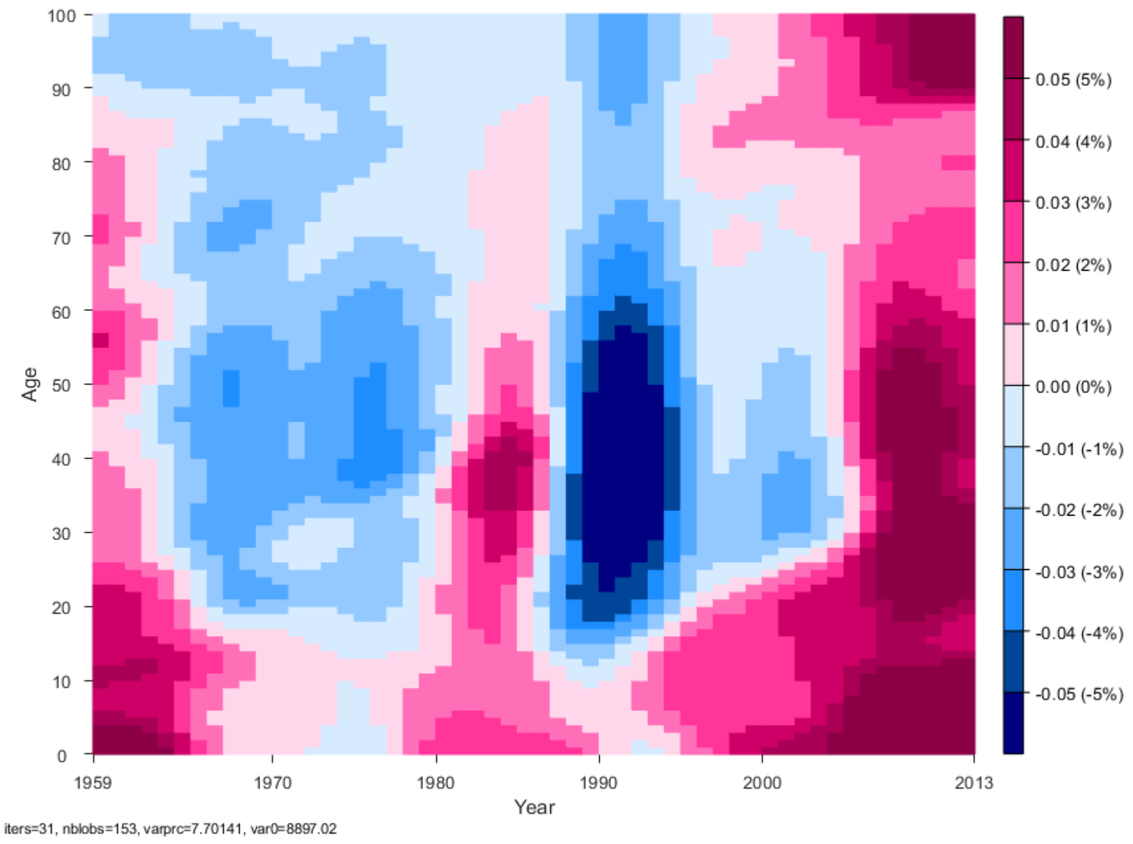
Females



iters=1, nblobs=91, varprc=99.2849, var0=787.78

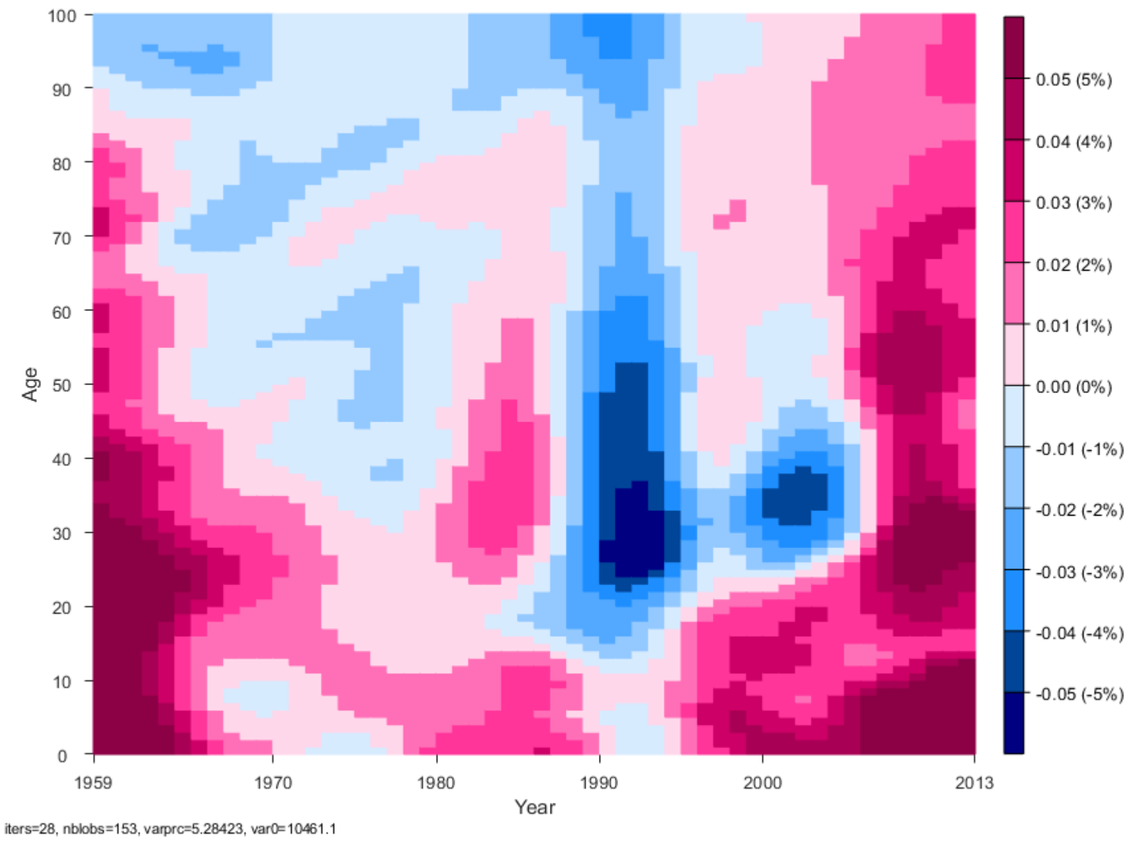
Ukraine

Males



iters=31, nblobs=153, varprc=7.70141, var0=8897.02

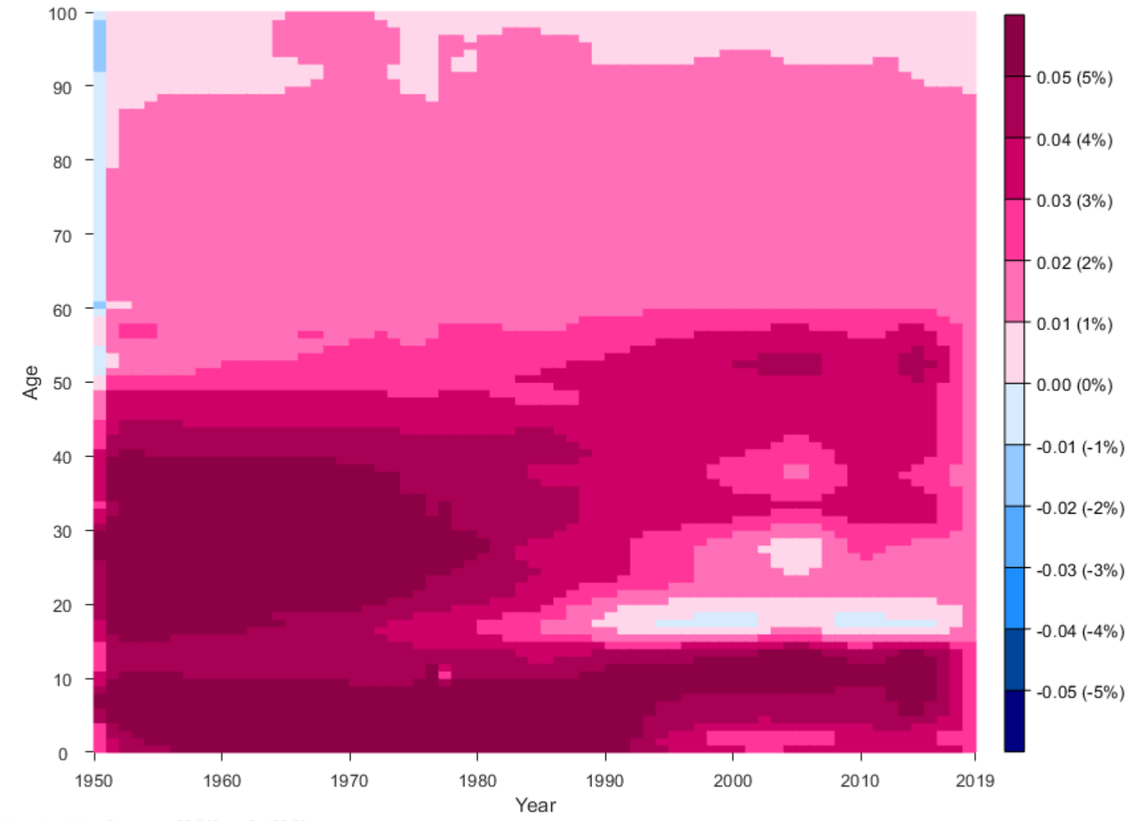
Females



iters=28, nblobs=153, varprc=5.28423, var0=10461.1

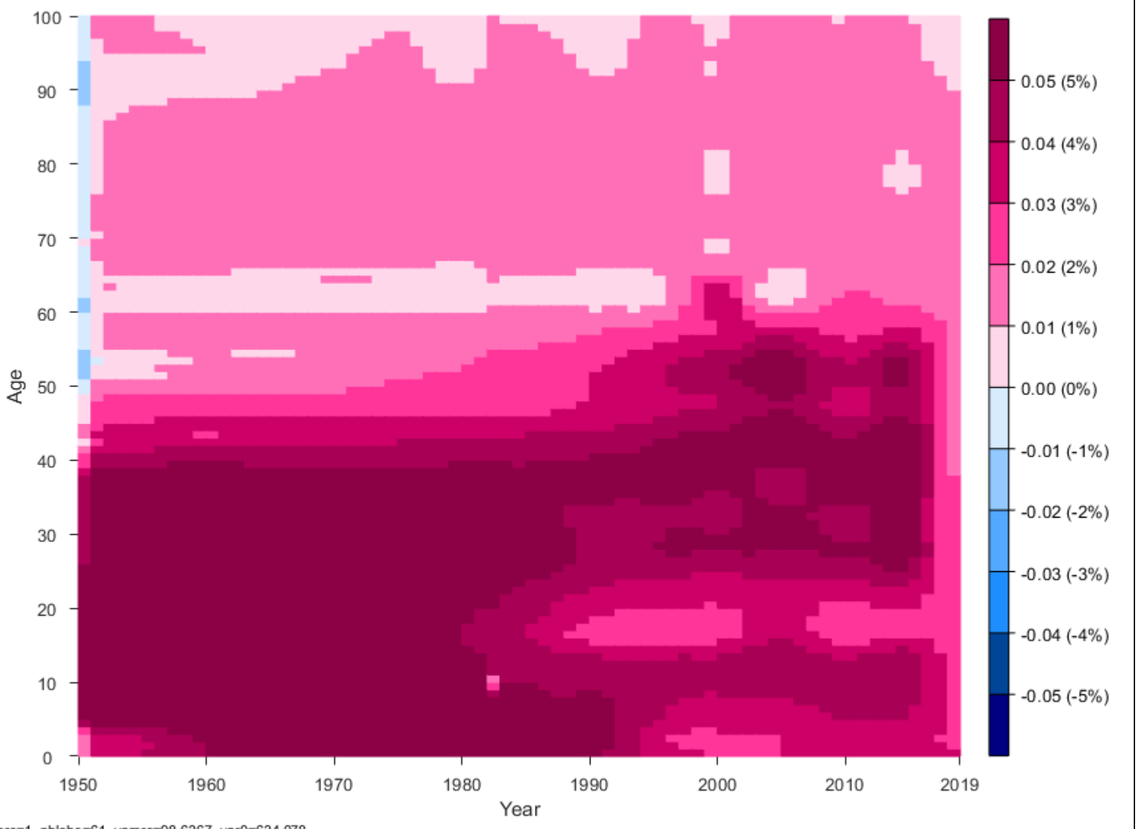
United Arab Emirates

Males



iters=1, nblobs=61, varprc=98.548, var0=468.89

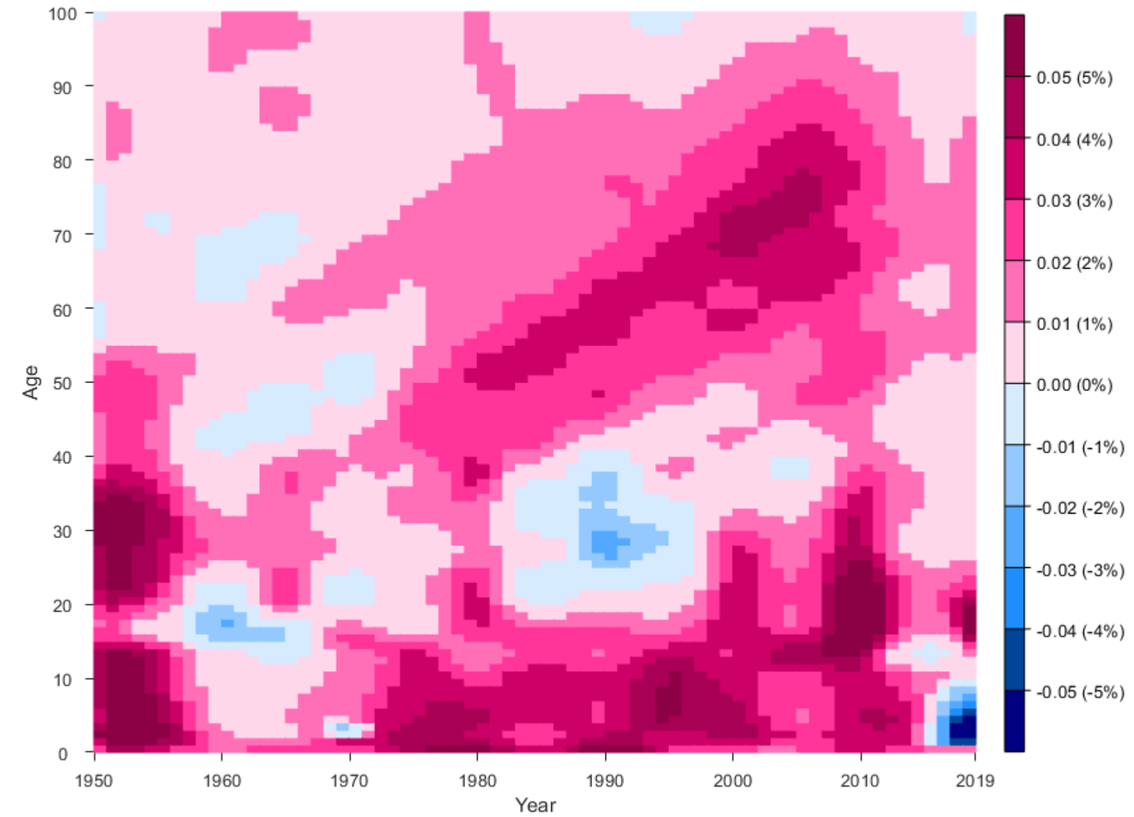
Females



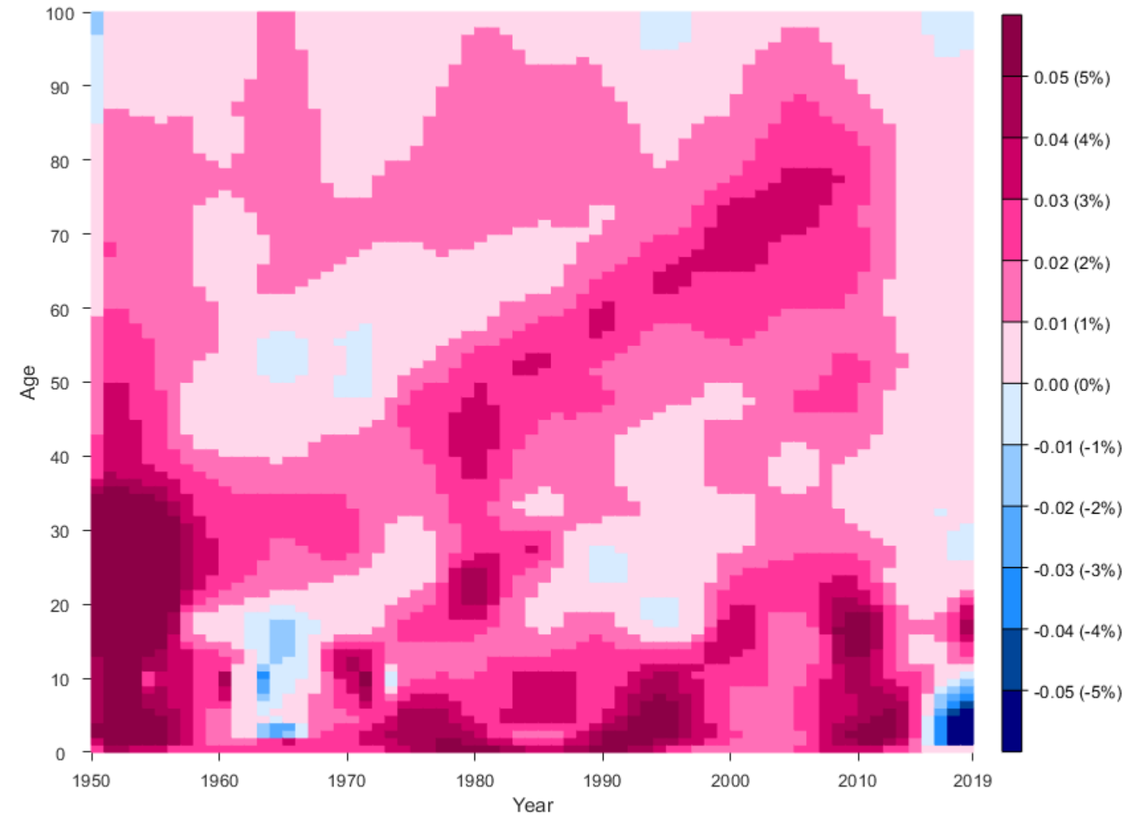
iters=1, nblobs=61, varprc=98.6367, var0=634.078

United Kingdom

Males

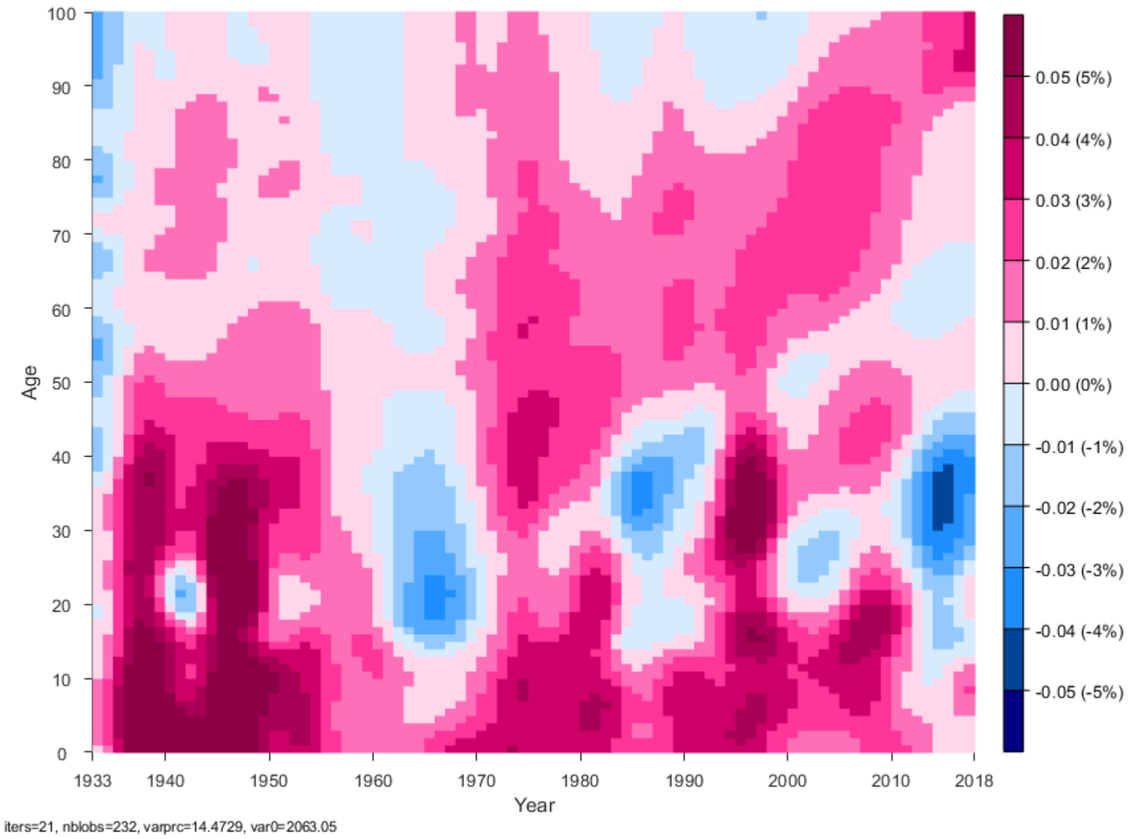


Females



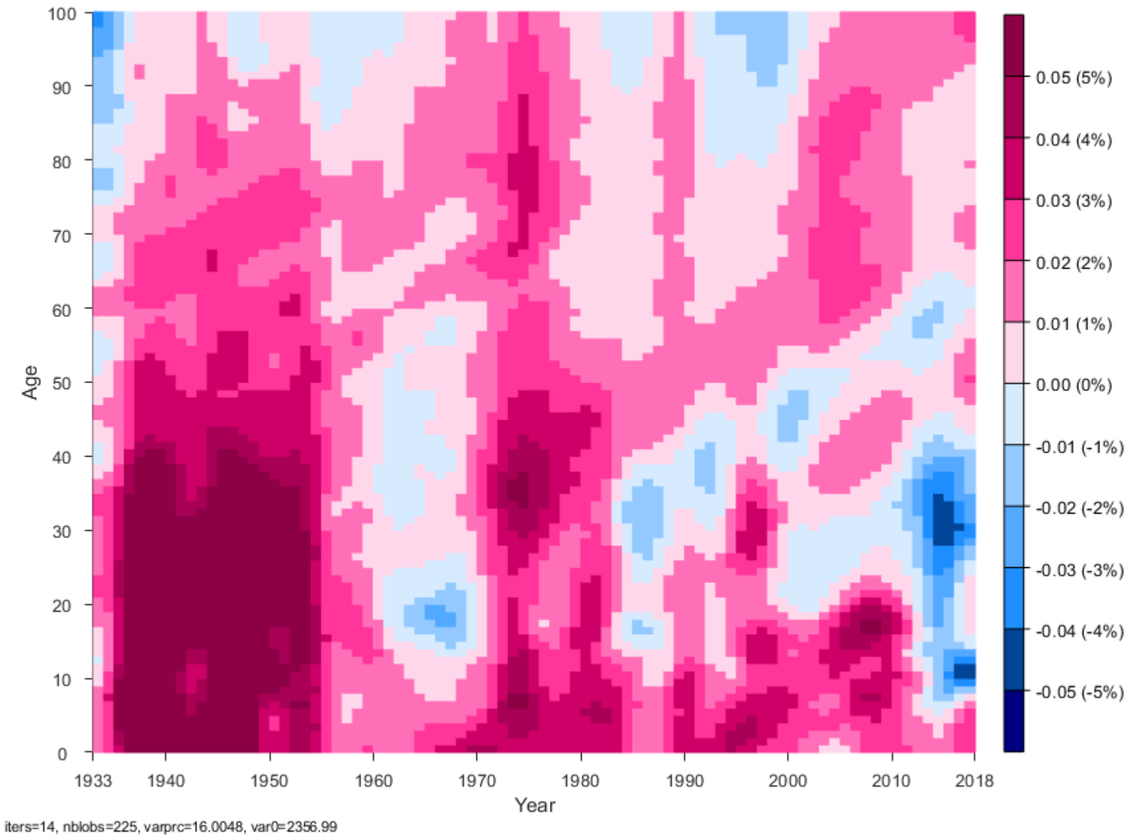
United States of America

Males



iters=21, nblobs=232, varprc=14.4729, var0=2063.05

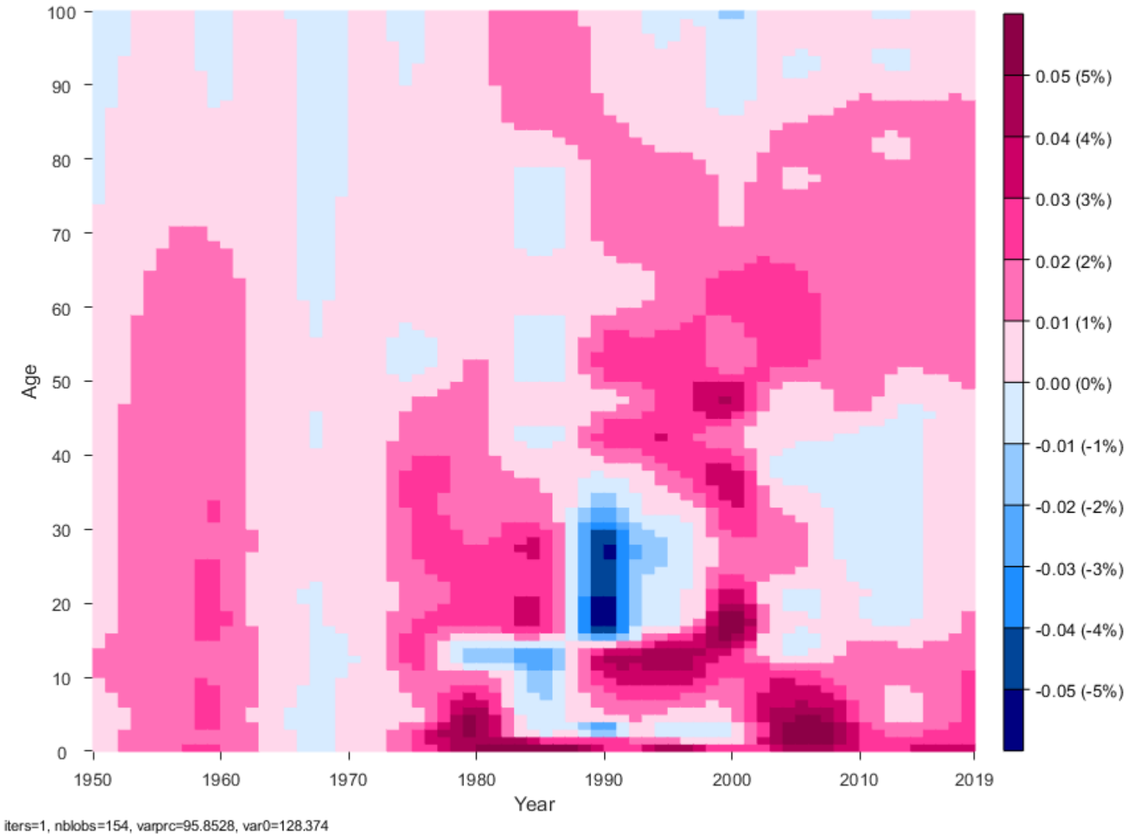
Females



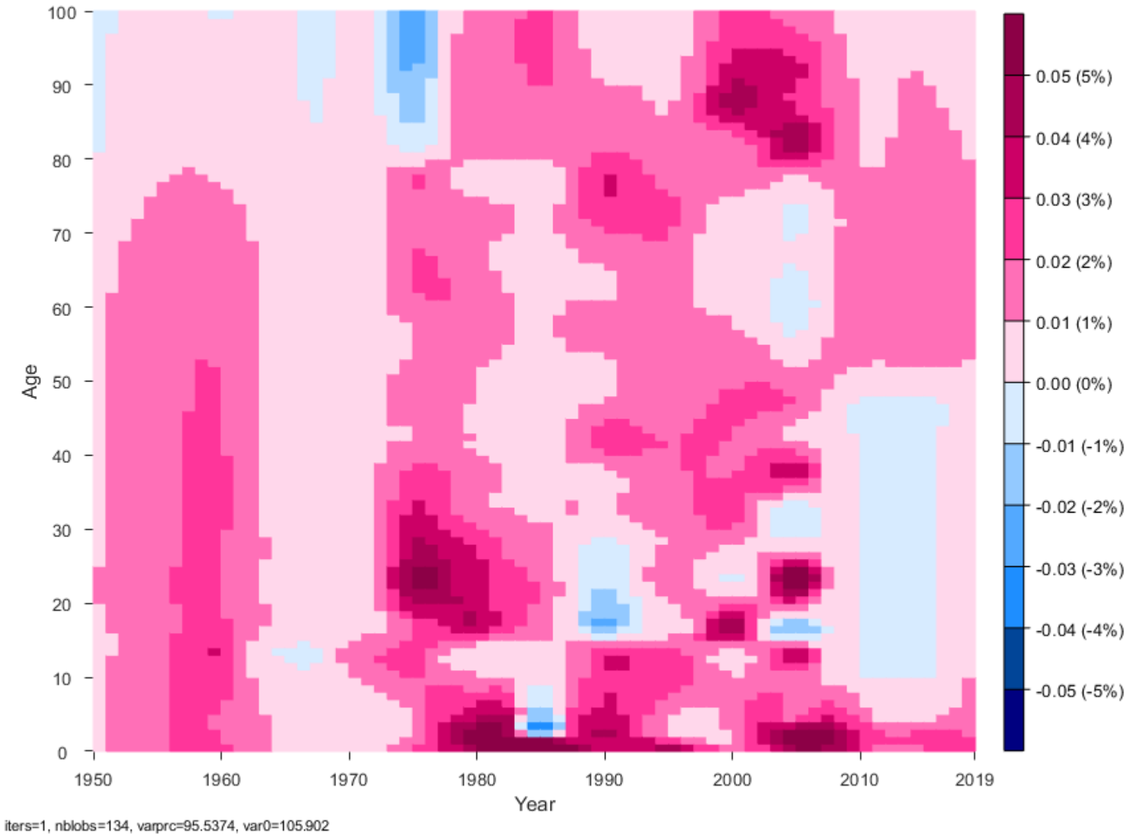
iters=14, nblobs=225, varprc=16.0048, var0=2356.99

Uruguay

Males

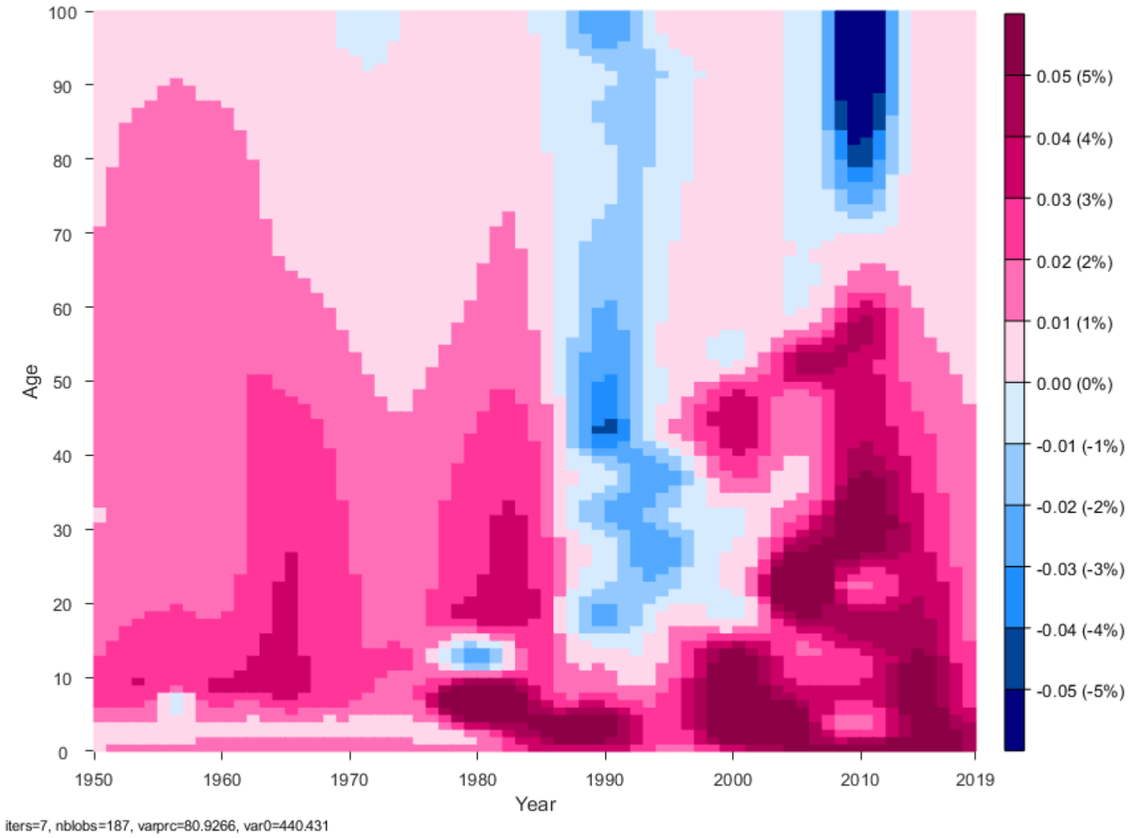


Females

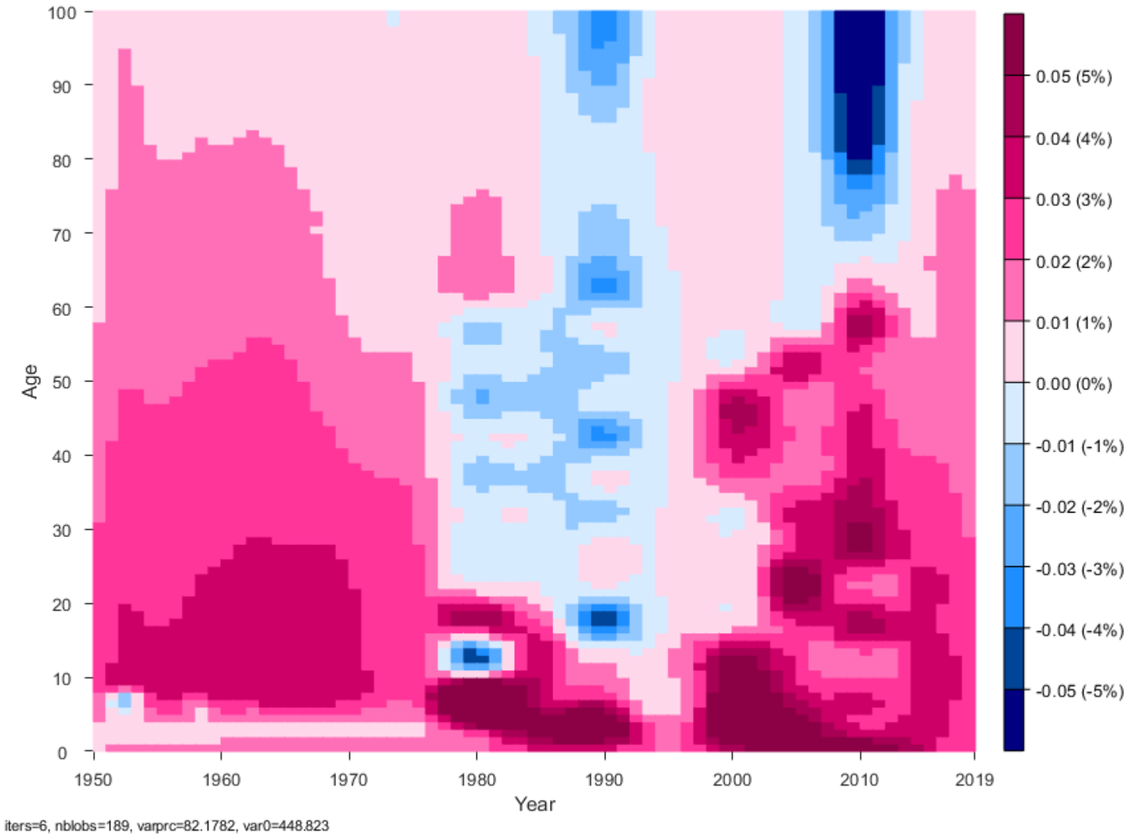


Uzbekistan

Males

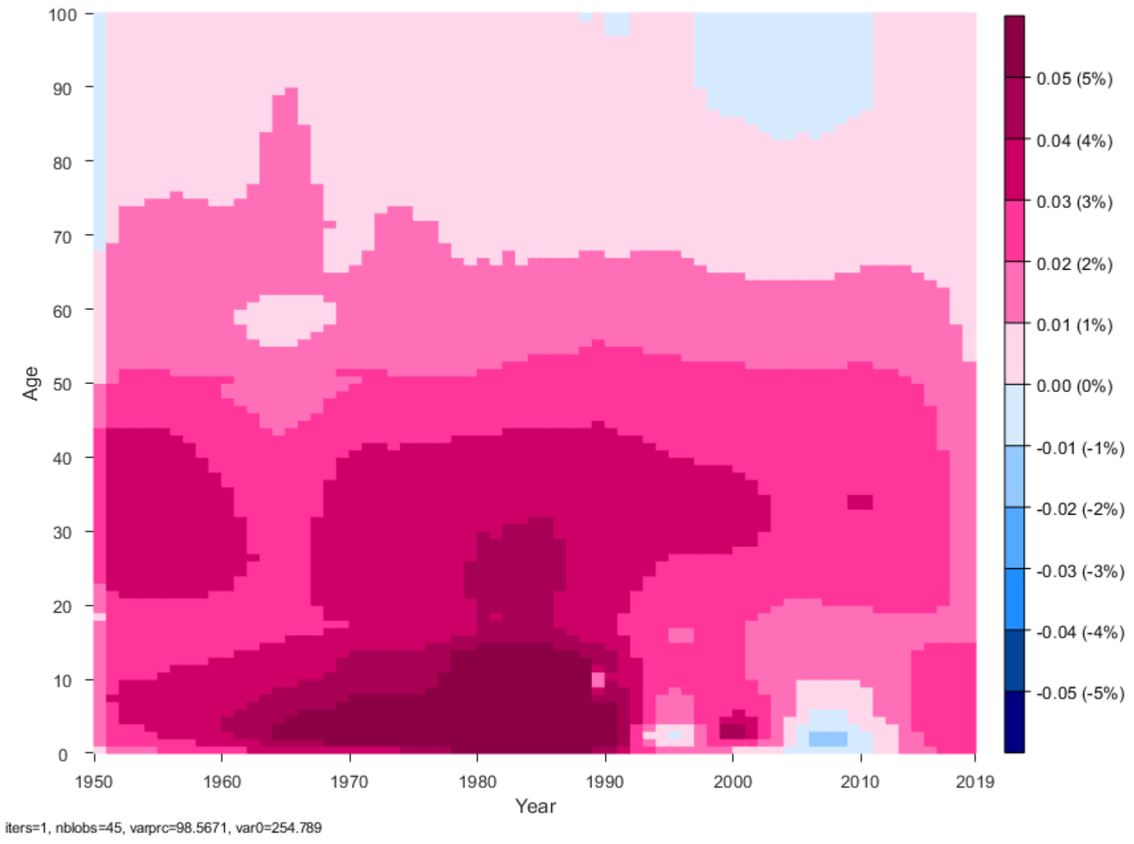


Females



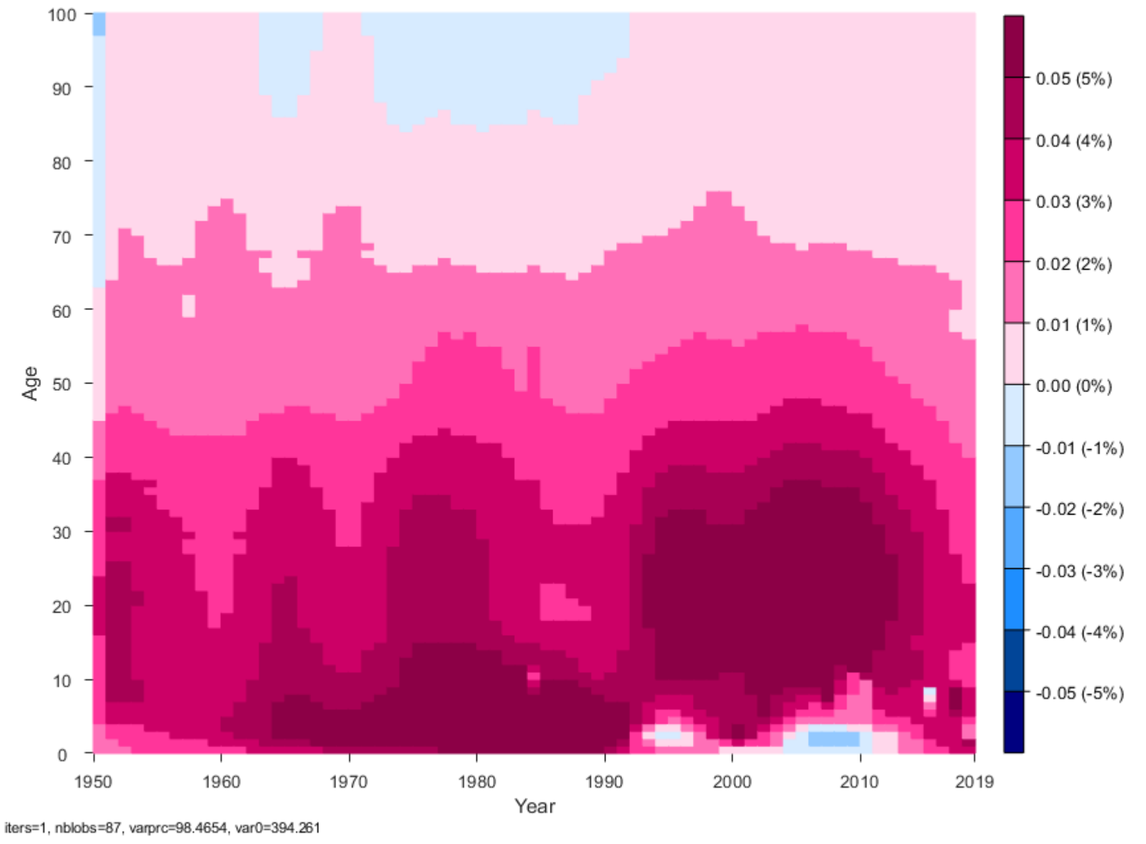
Vanuatu

Males



iters=1, nblobs=45, varprc=98.5671, var0=254.789

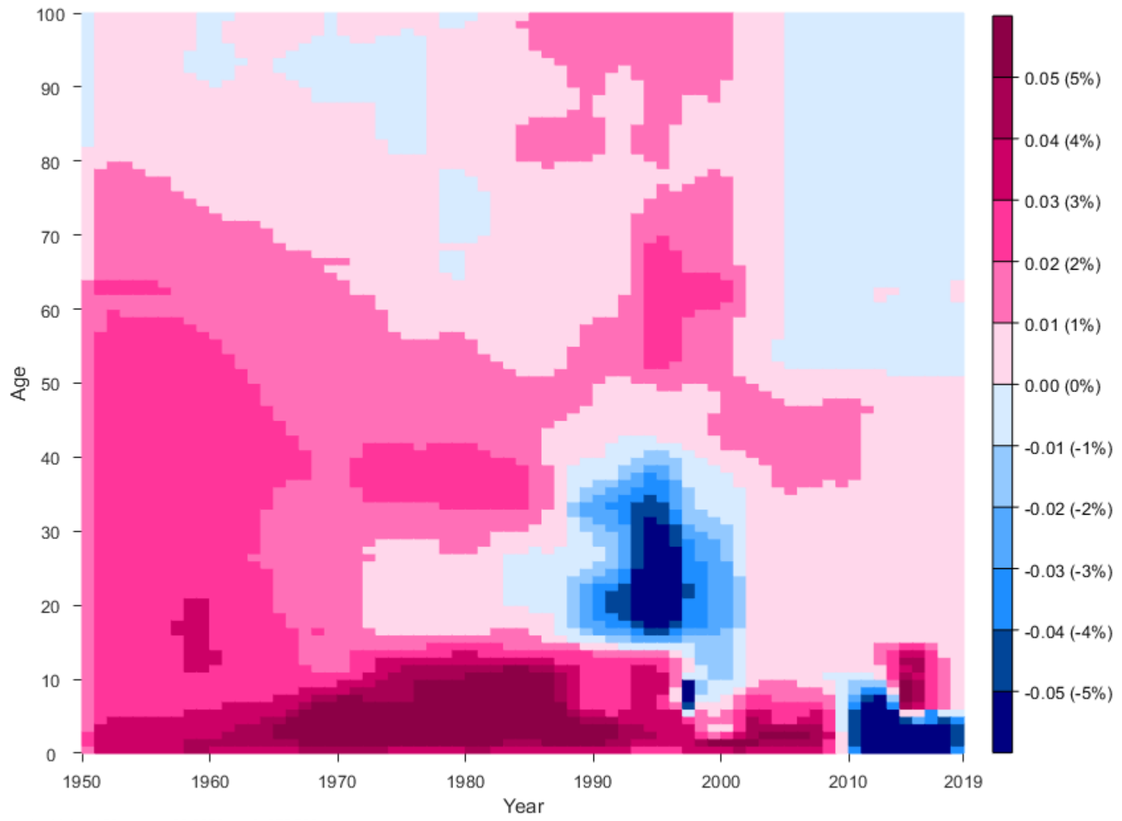
Females



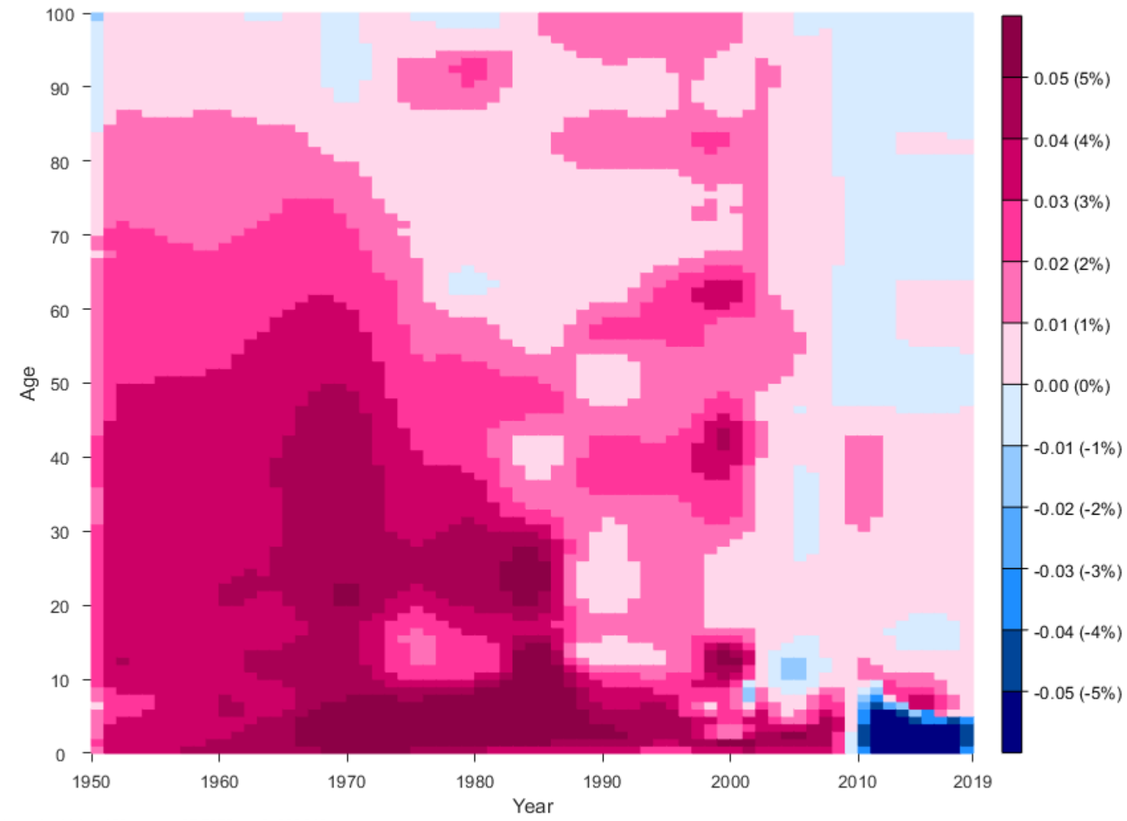
iters=1, nblobs=87, varprc=98.4654, var0=394.261

Venezuela (Bolivarian Republic of)

Males

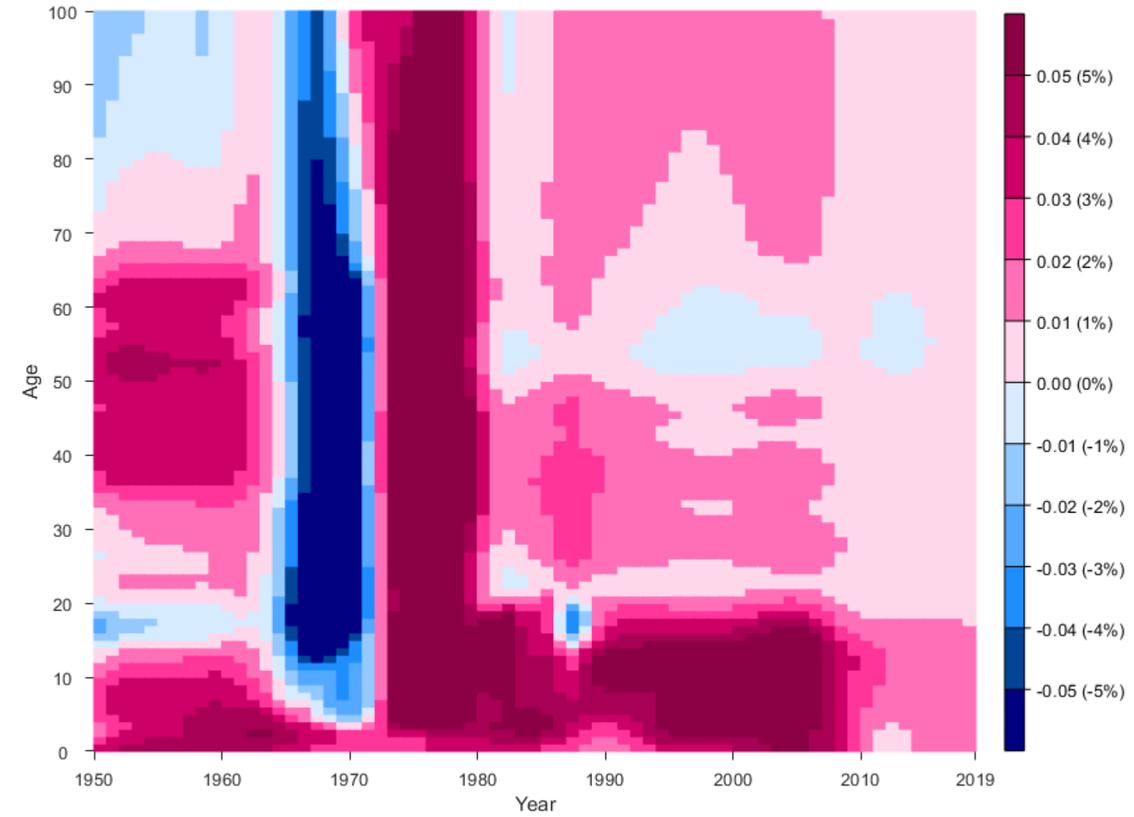


Females



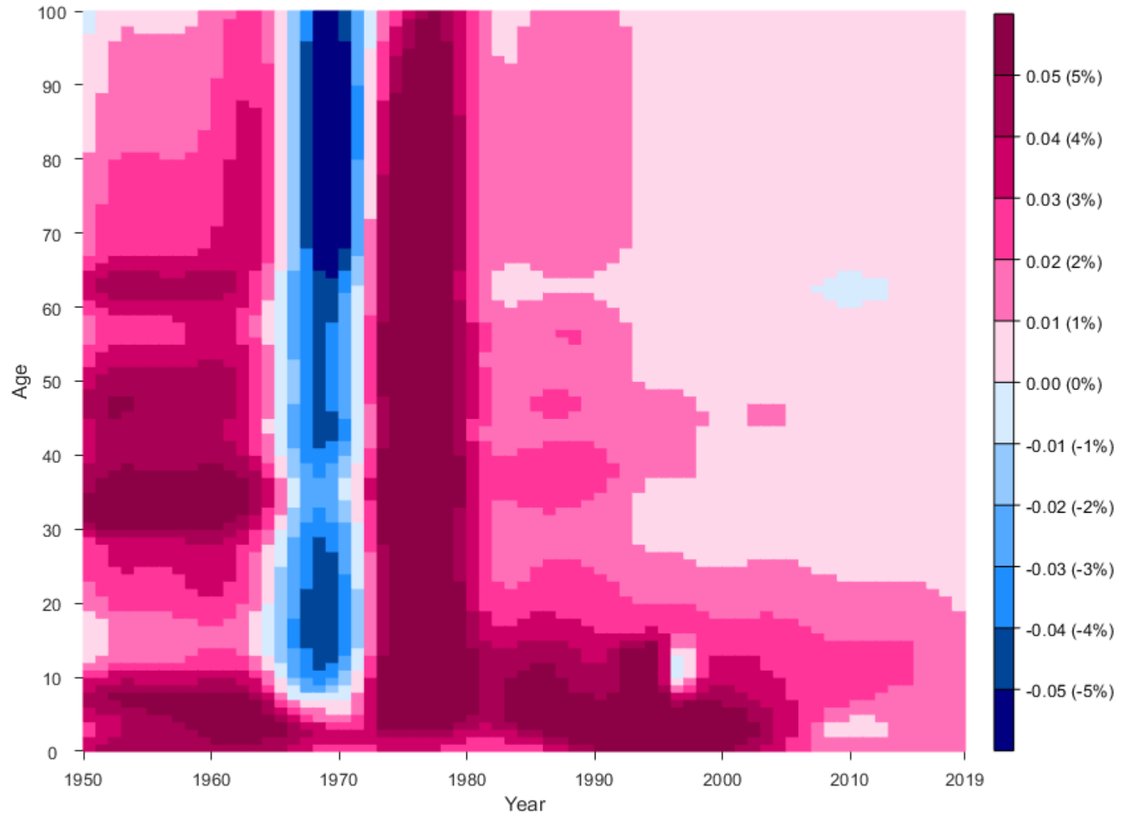
Viet Nam

Males



iters=6, nblobs=193, varprc=83.0933, var0=1170.09

Females

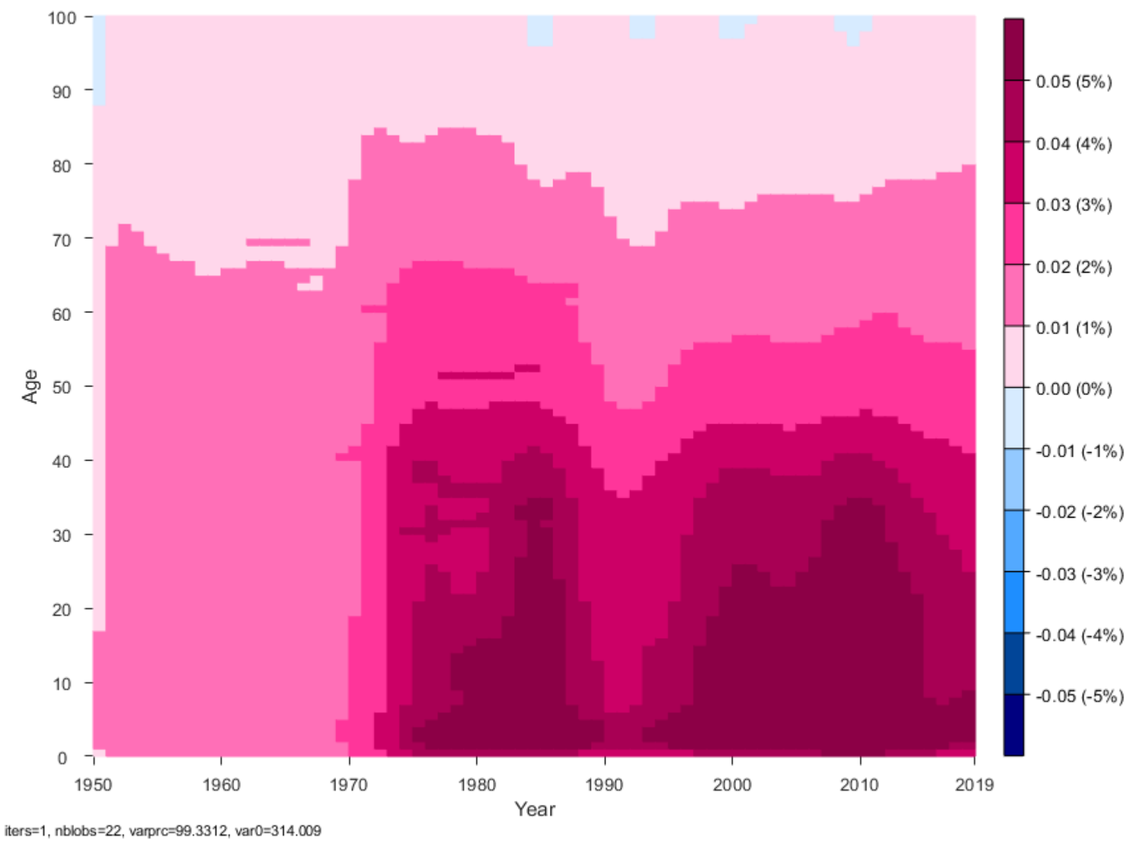


iters=7, nblobs=187, varprc=80.9785, var0=891.2

Western Sahara

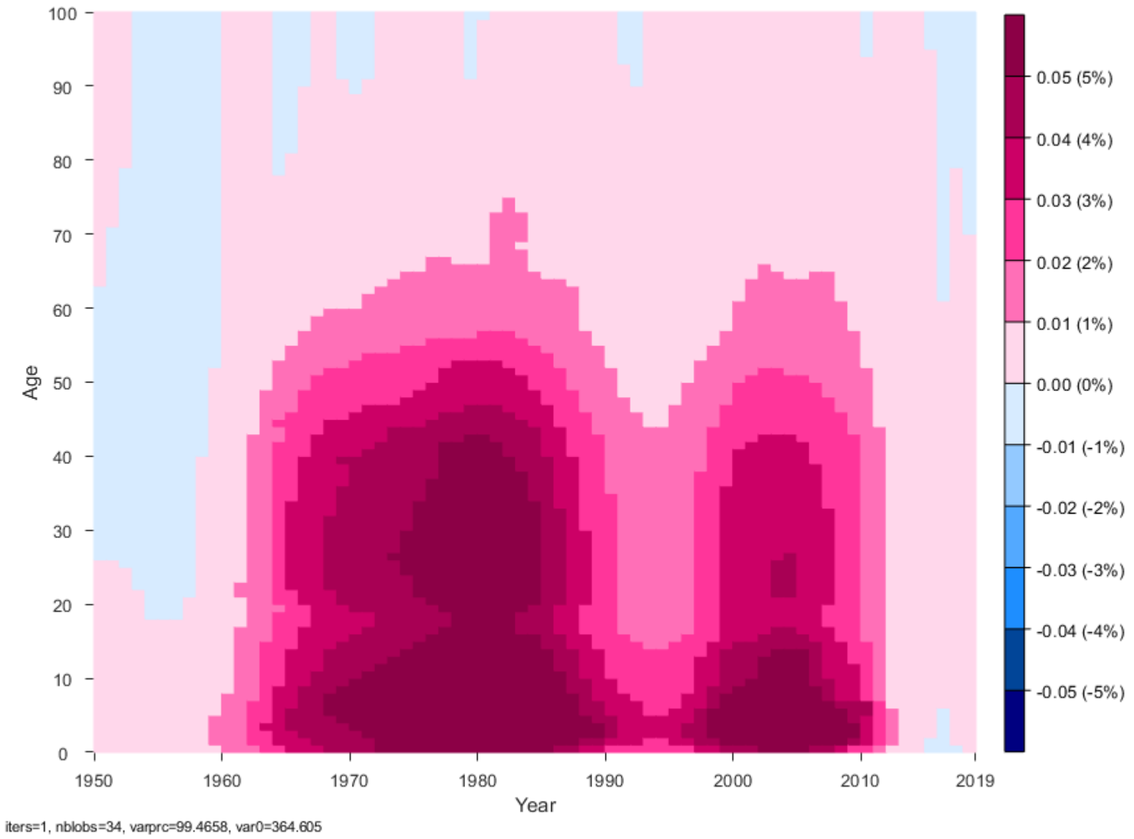
Males

Females



Yemen

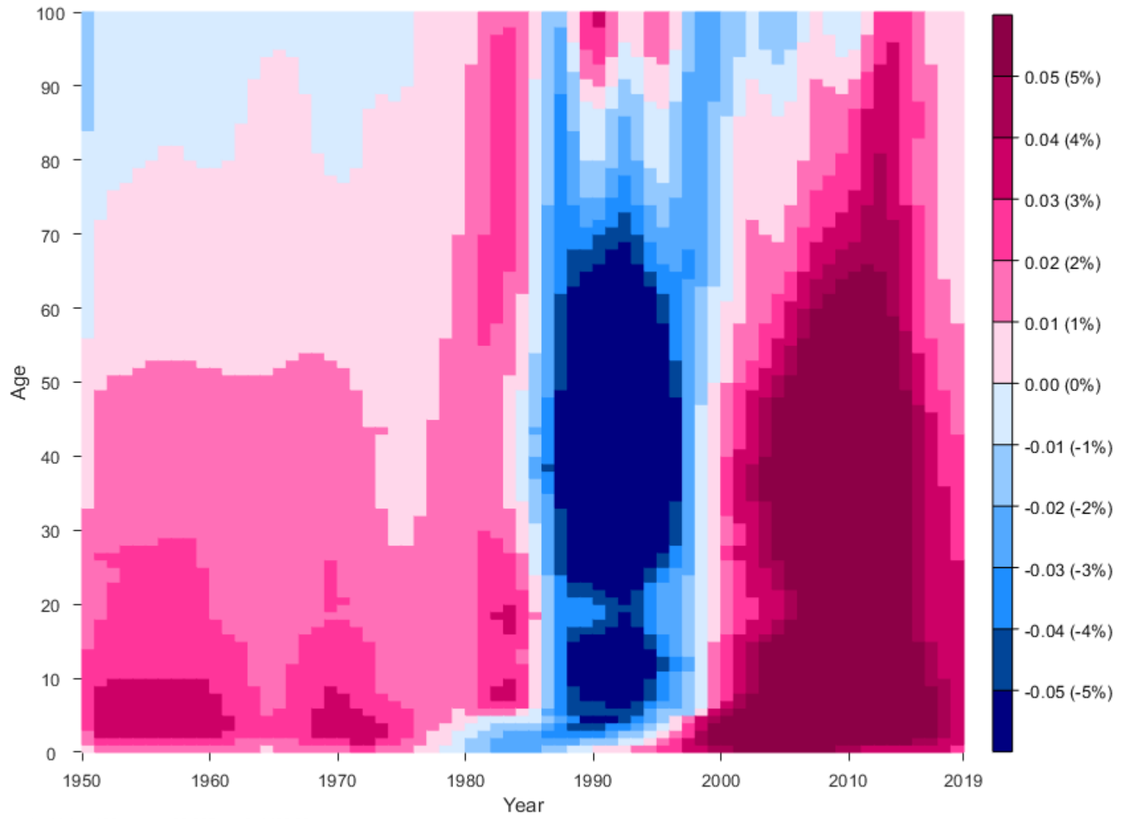
Males



Females

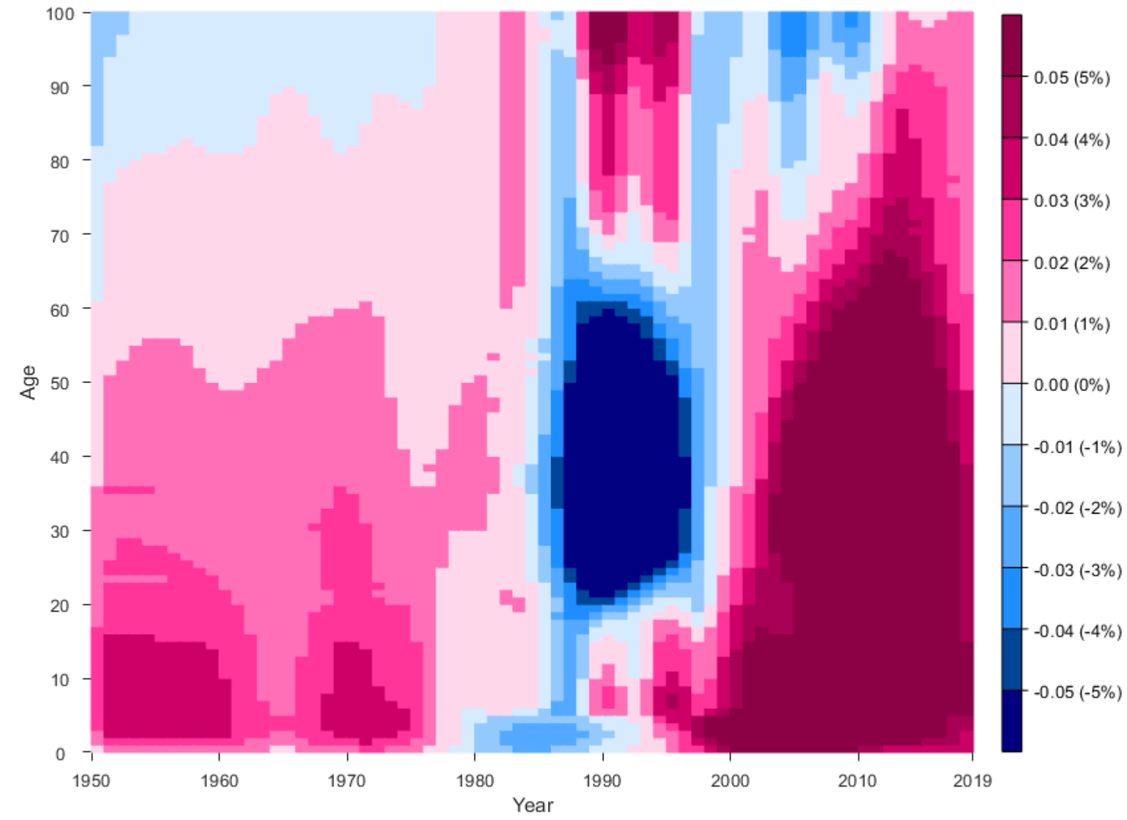
Zambia

Males



iters=1, nblobs=190, varprc=98.885, var0=1439.88

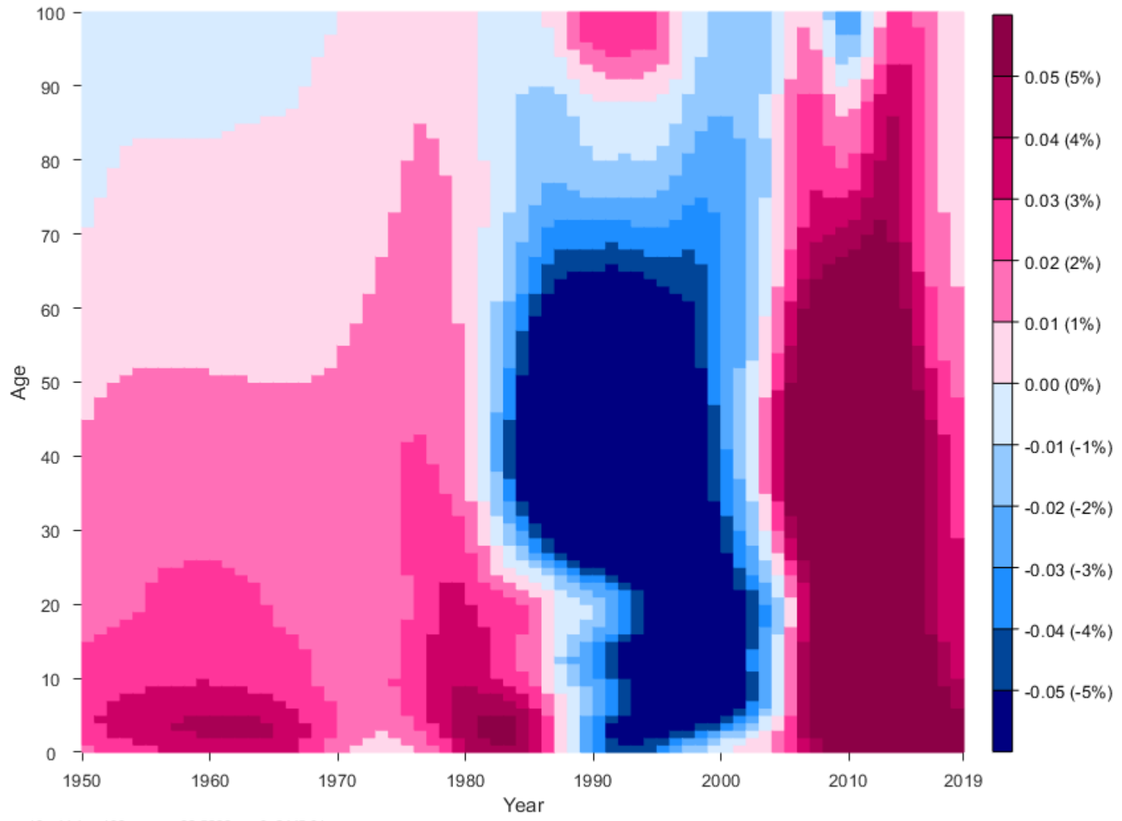
Females



iters=1, nblobs=196, varprc=98.9149, var0=1482.03

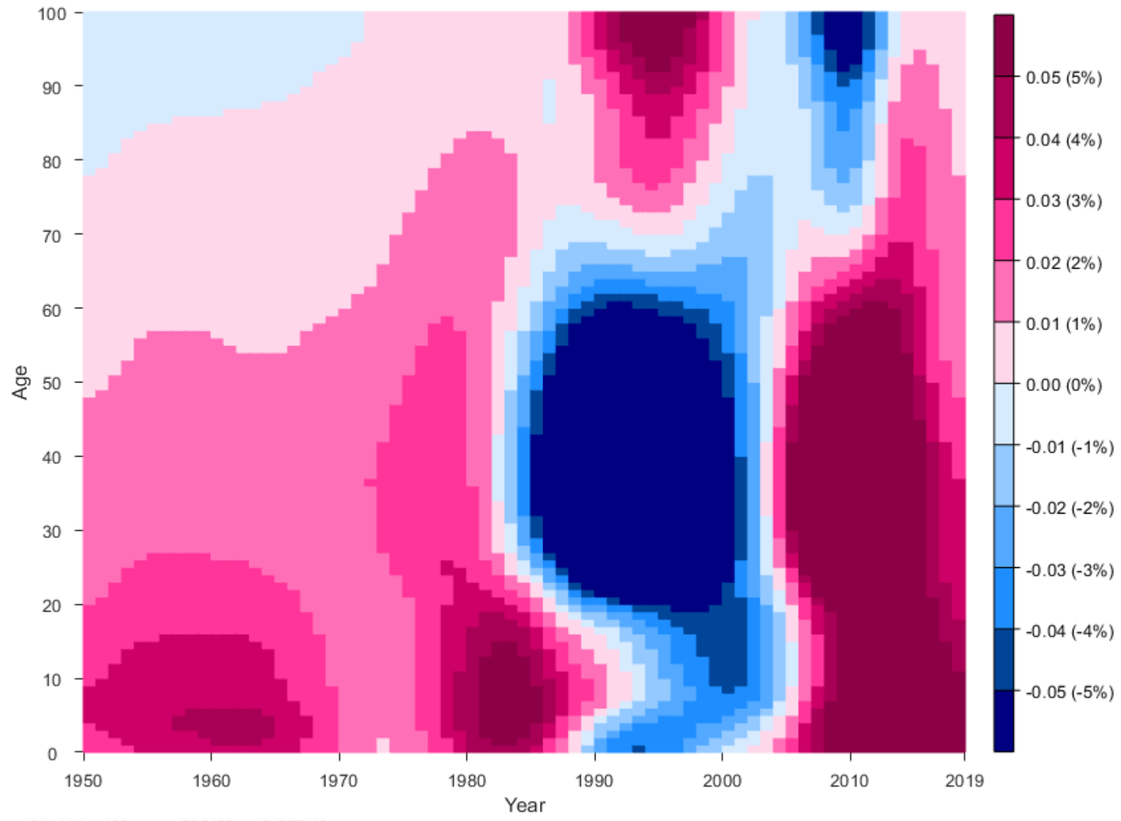
Zimbabwe

Males



iters=13, nblobs=193, varprc=88.5298, var0=2445.01

Females



iters=24, nblobs=195, varprc=78.2402, var0=2473.19