Appendix K2: Model Differences for TCSAM02 Models B1, AG4, and AG1c

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Introduction

This document presents results from the comparison of TCSAM02 modelsB1, AG4 and AG1c. The following plots show differences between the set of models for a variety of quantities.

Population processes

Natural mortality

natural mortality

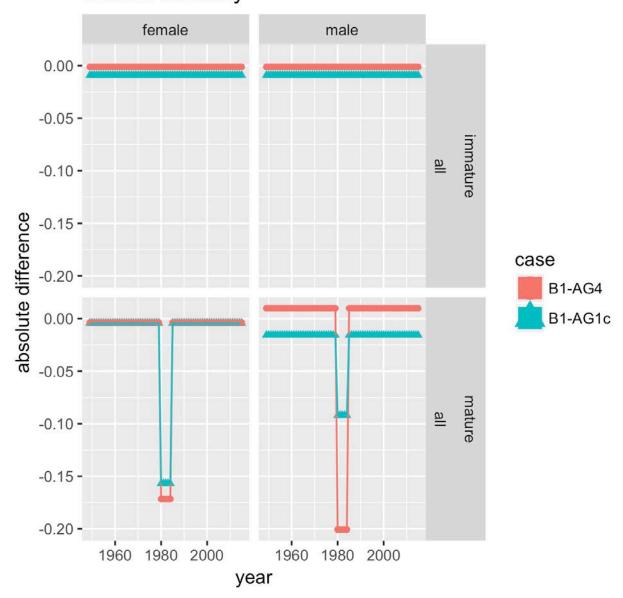


Figure 1. Differences for natural mortality.

Probability of terminal molt

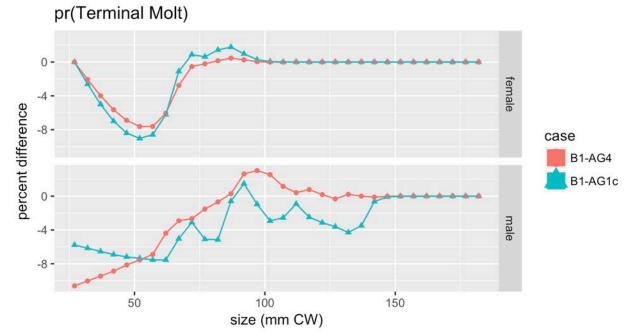


Figure 2. Differences for probability of terminal molt.

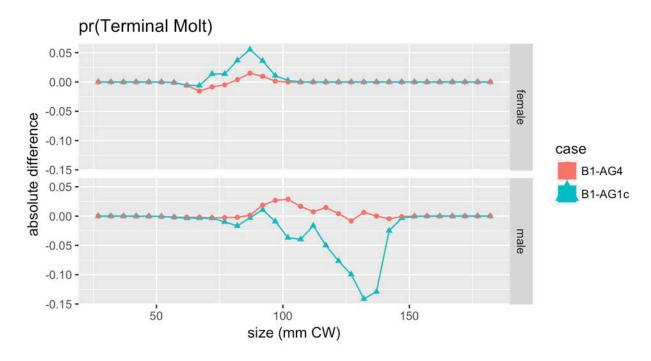


Figure 3. Differences for probability of terminal molt.

Mean growth

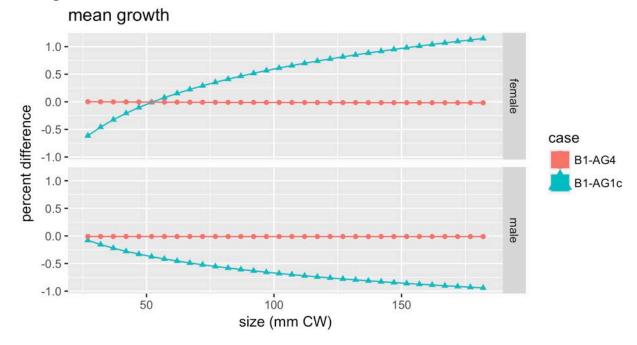


Figure 4. Differences for mean growth.

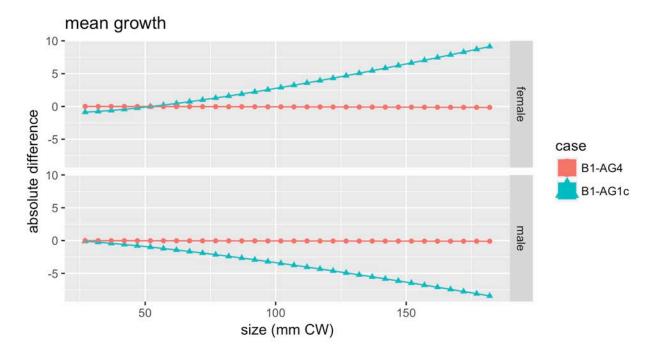


Figure 5. Differences for mean growth.

Growth matrices

plotting growth matrix for female plotting growth matrix for male

growth matrices for female

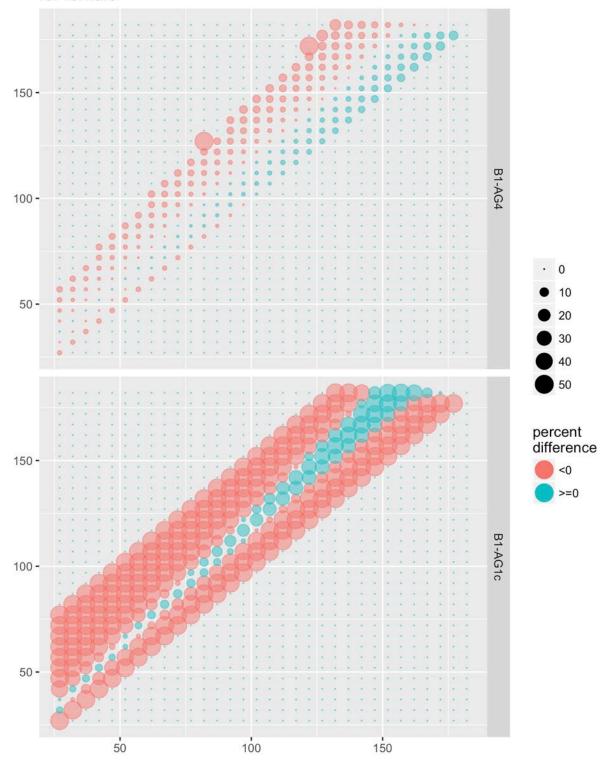


Figure 6. Growth matrix differences for female.

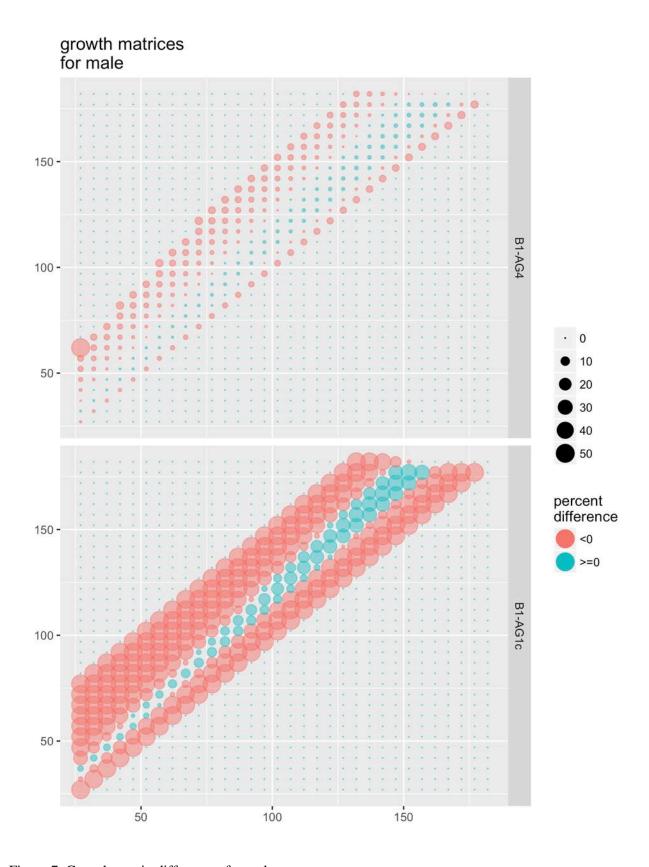


Figure 7. Growth matrix differences for male.

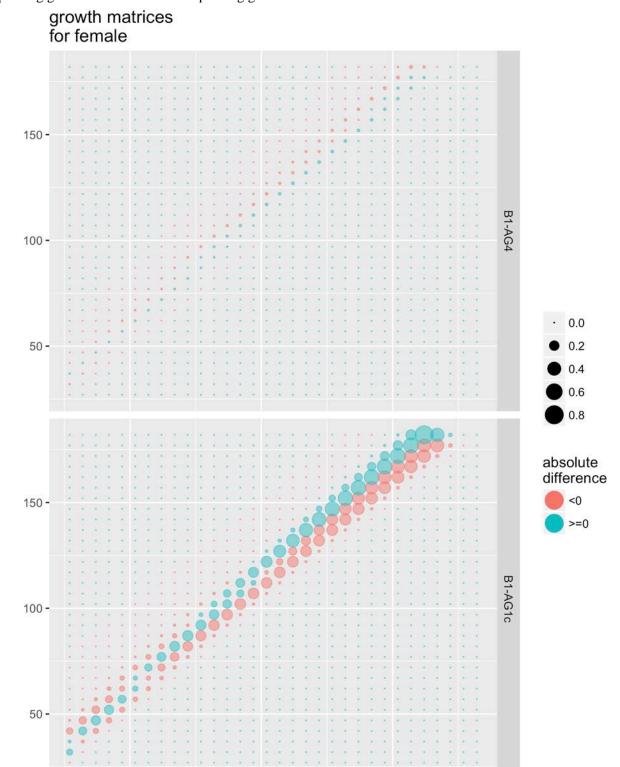


Figure 8. Growth matrix differences for female.

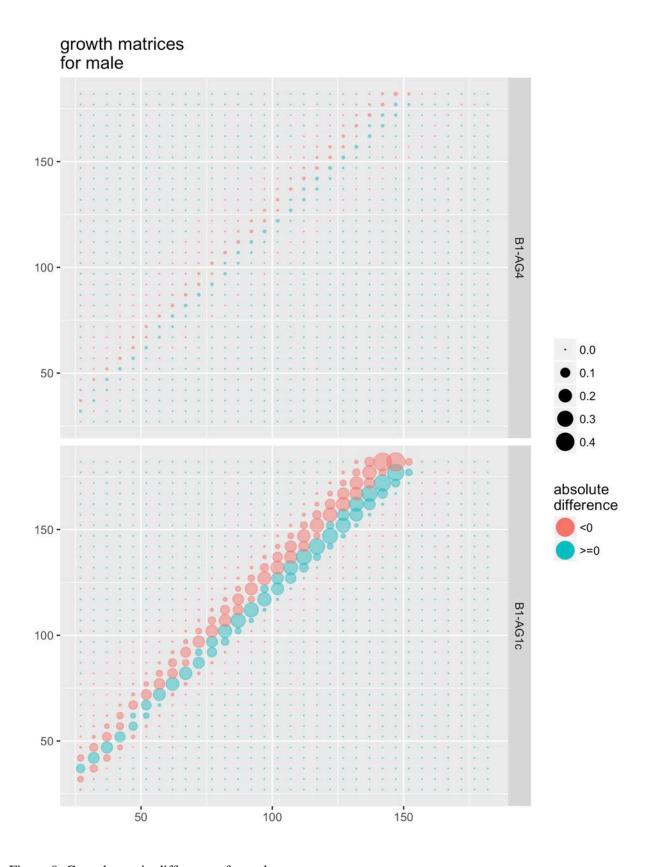


Figure 9. Growth matrix differences for male.

Size distribution for recruits

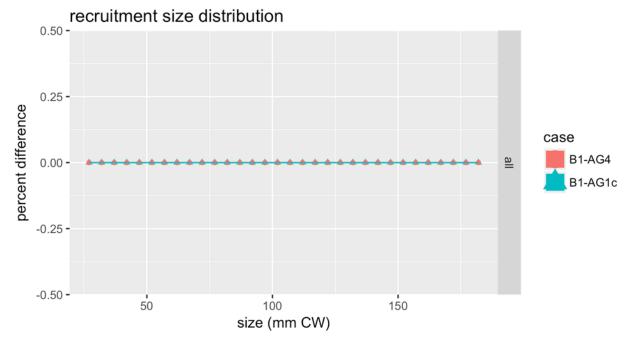


Figure 10. Differences for recruitment size distribution.

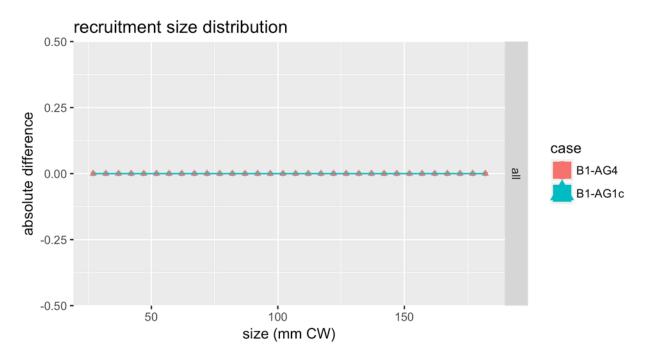


Figure 11. Differences for recruitment size distribution.

Population results

Recruitment

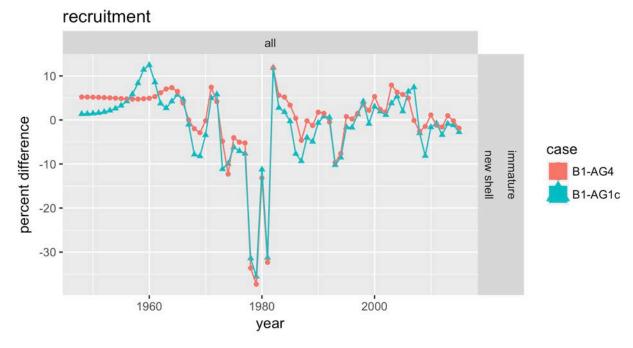


Figure 12. Differences for recruitment.

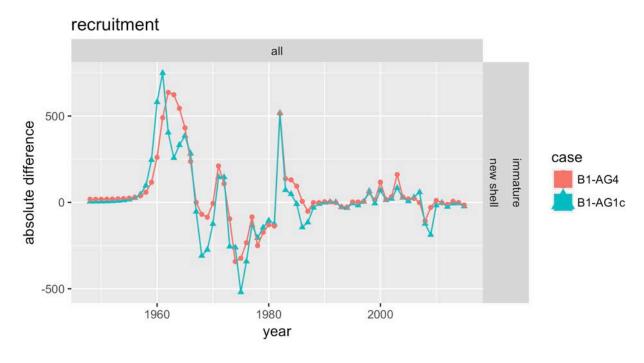


Figure 13. Differences for recruitment.

Population abundance

population abundance

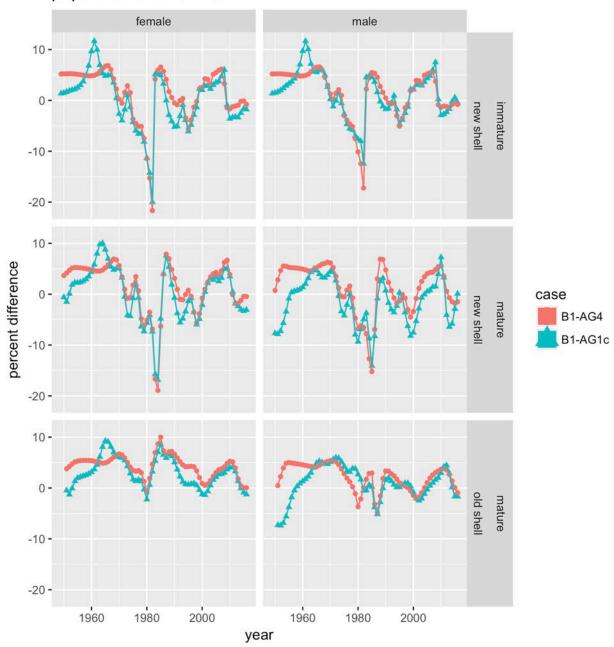


Figure 14. Differences for population abundance.

population abundance female male 500 immature new shell -500 absolute difference 500 case new shell mature B1-AG4 B1-AG1c -500 **-**500 old shell mature -500 **-**1960 1980 2000 1960 1980 2000

year

Figure 15. Differences for population abundance.

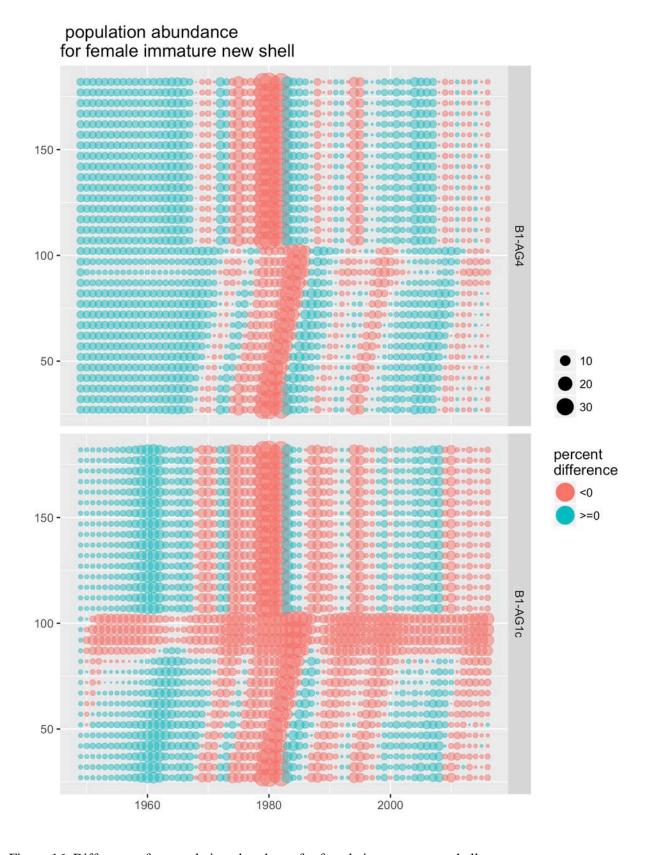


Figure 16. Differences for population abundance for female immature new shell.

population abundance for female mature new shell 00-00000000000000000000000 150 -00-0-00-000--0000-00000-00-00--0-0---------0-00-0-000---00-0000-00-00-00 0000 - 000 - - 000 - - - 0000 - 000)•@@oo • oo • • •@@o • • oo oo oo@o • oo o 100 -50 -40 percent difference <0 150 -100 -50 -1980 2000 1960

Figure 17. Differences for population abundance for female mature new shell.

population abundance for female mature old shell 150 -100 -50 -40 percent difference <0 150 -100 -50 -1960 2000 1980

Figure 18. Differences for population abundance for female mature old shell.

population abundance for male immature new shell 150 -100 -50 -40 percent difference <0 150 ->=0 100 -50 -1980 1960 2000

Figure 19. Differences for population abundance for male immature new shell.

population abundance for male mature new shell 150 -100 -50 -40 percent difference <0 150 -100 -50 -1980 2000 1960

Figure 20. Differences for population abundance for male mature new shell.

population abundance for male mature old shell 150 -100 -50 -40 percent difference <0 150 -100 -50 -1960 1980 2000

Figure 21. Differences for population abundance for male mature old shell.

population abundance for female immature new shell 150 -100 -50 -100 absolute difference >=0 150 -100 -50 -

Figure 22. Differences for population abundance for female immature new shell.

1960

1980

2000

population abundance for female mature new shell

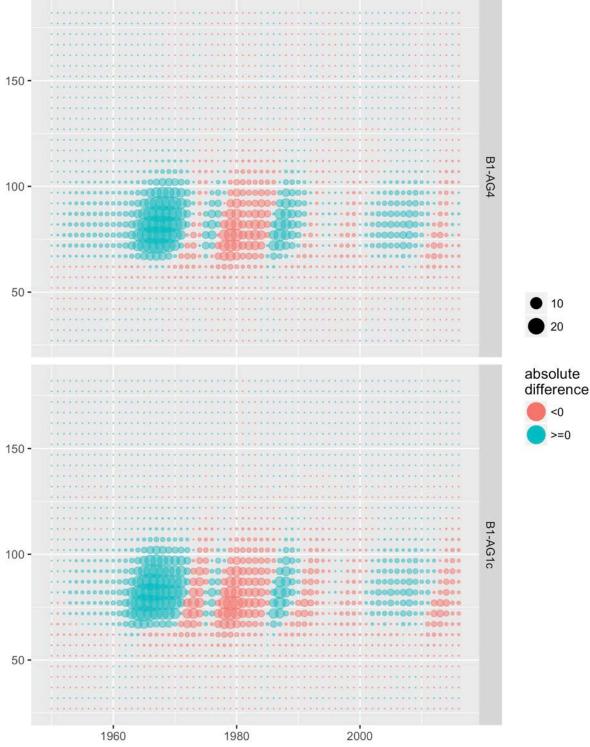


Figure 23. Differences for population abundance for female mature new shell.

population abundance for female mature old shell 150 -100 -50 absolute difference 150 -100 -50 -1960 1980 2000

Figure 24. Differences for population abundance for female mature old shell.

population abundance for male immature new shell 150 -100 -50 -100 absolute difference >=0 150 -************************************* 100 -

2000

Figure 25. Differences for population abundance for male immature new shell.

1960

1980

50 -

population abundance for male mature new shell 150 -100 -50 -5.0 7.5 absolute difference --------<0 ************************************* 150 -D: 000 · · · · 0 000 · · 0 · 0 000 · 01 100 -0.00------------50 -

Figure 26. Differences for population abundance for male mature new shell.

1980

2000

1960

population abundance for male mature old shell ------0000---------150 -100 -.......... 50 -15 absolute difference <0 00000-00-----------------150 -100-----100 -.............. 50 -

Figure 27. Differences for population abundance for male mature old shell.

1980

2000

1960

Biomass

population biomass

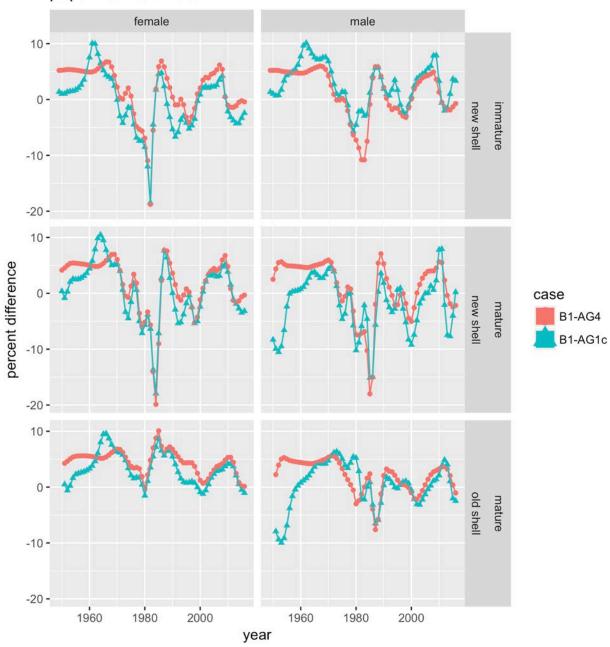


Figure 28. Differences for population biomass.

population biomass

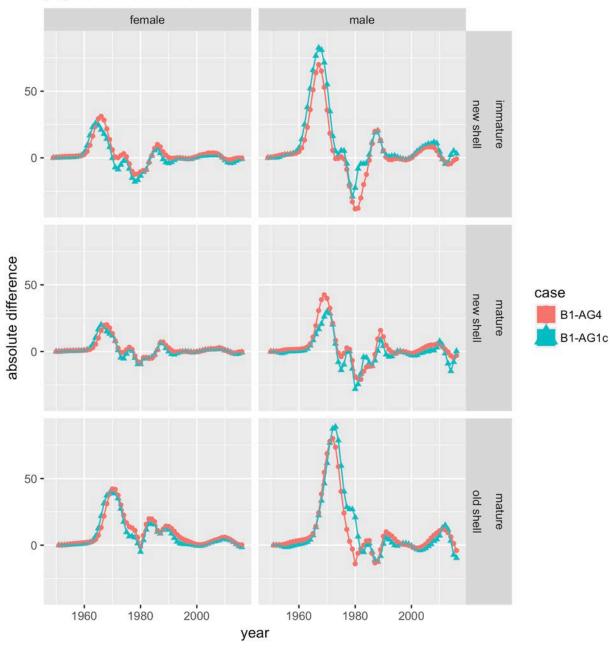


Figure 29. Differences for population biomass.

Surveys

Survey catchability

NMFS trawl survey: survey catchability

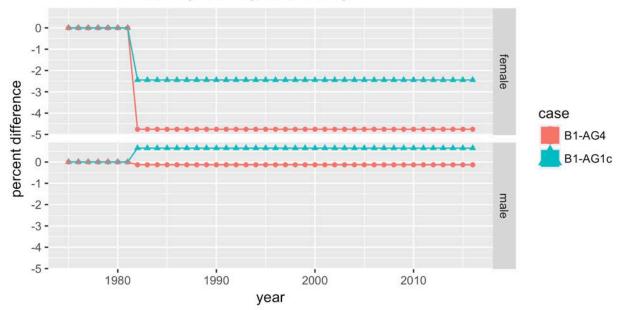


Figure 30. Differences for NMFS trawl survey: survey catchability.

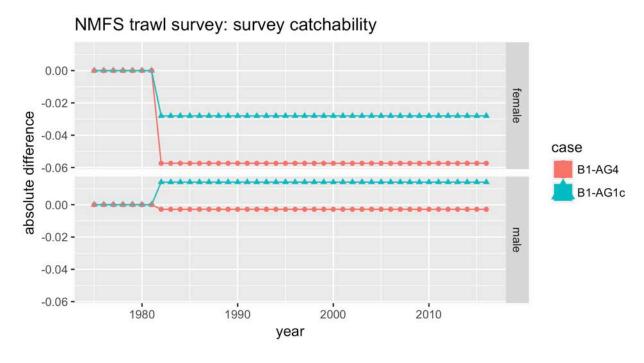


Figure 31. Differences for NMFS trawl survey: survey catchability.

Survey selectivity functions

NMFS trawl survey survey selectivity for female all maturity all shell

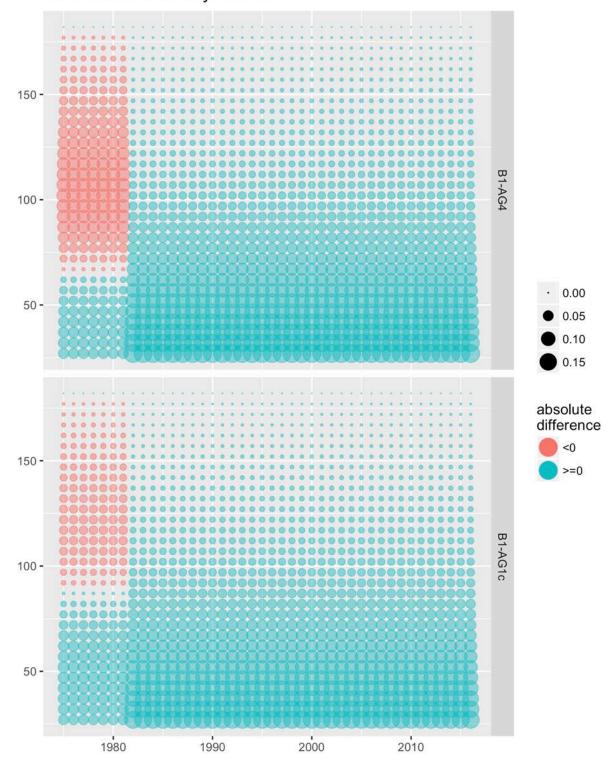


Figure 32. Differences for NMFS trawl survey survey selectivity for female all maturity all shell.

NMFS trawl survey survey selectivity for male all maturity all shell

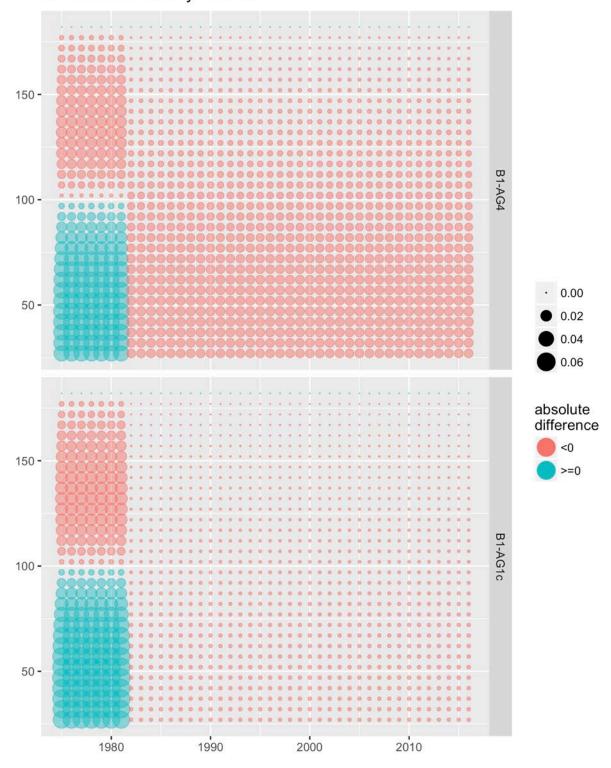


Figure 33. Differences for NMFS trawl survey survey selectivity for male all maturity all shell.

NMFS trawl survey females: survey selectivity 1976 1977 1975 1978 1979 0.1 -0.0 -0.1 1980 1981 1982 1983 1984 0.1 -0.0 -0.1 **-**1985 1986 1987 1988 1989 0.1 -0.0 --0.1 **-**1990 1991 1992 1993 1994 0.1 -0.0 --0.1 absolute difference 1996 1997 1998 1999 1995 case 0.1 B1-AG4 0.0 -B1-AG1c -0.1 -2000 2001 2002 2003 2004 0.1 -0.0 --0.1 **-**2005 2007 2008 2009 2006 0.1 -0.0 --0.1 **-**2010 2012 2013 2014 2011 0.1 -0.0 --0.1 **-**50 100 150 50 100 150 50 100 150 2015 2016 0.1 0.0 -0.1 **-**50 100 150 50 100 150 size (mm CW)

Figure 34. Differences for NMFS trawl survey females: survey selectivity.

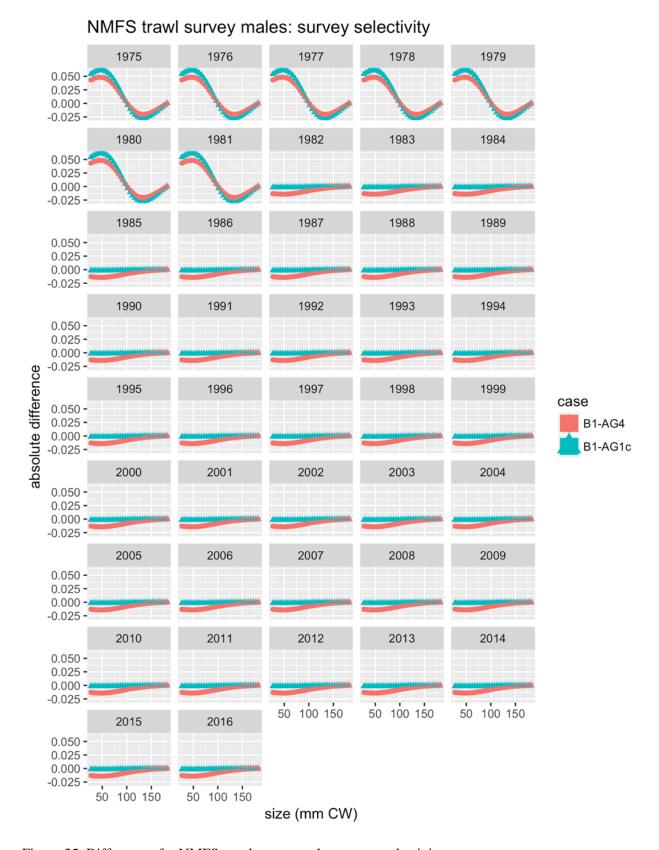


Figure 35. Differences for NMFS trawl survey males: survey selectivity.

NMFS trawl survey: survey selectivity 0.1 female 1975 0.0 --0.1 0.1 female 1982 0.0 --0.1 -0.1 female 1988 absolute difference 0.0 case -0.1 -B1-AG4 B1-AG1c 0.1 male 1975 0.0 --0.1 -0.1 male 1982 0.0 --0.1 -0.1 male 1988 0.0 --0.1 -50 100 150 size (mm CW)

Figure 36. Differences for NMFS trawl survey: survey selectivity.

Survey abundance

NMFS trawl survey: survey abundance

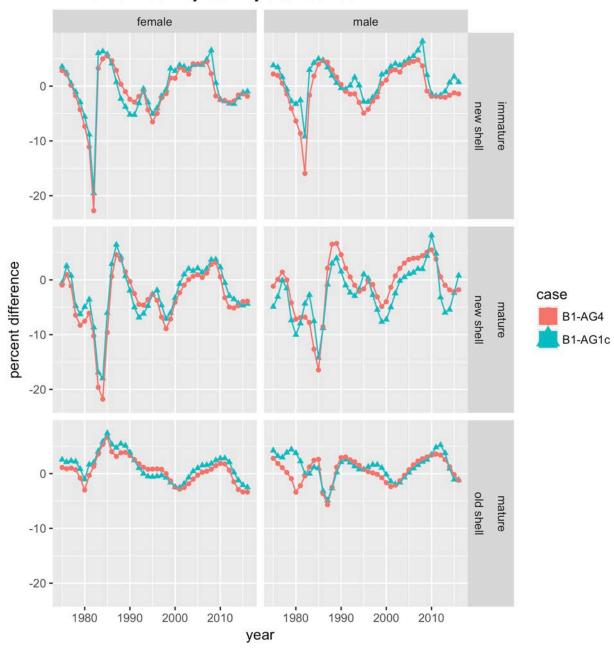


Figure 37. Differences for NMFS trawl survey: survey abundance.

NMFS trawl survey: survey abundance

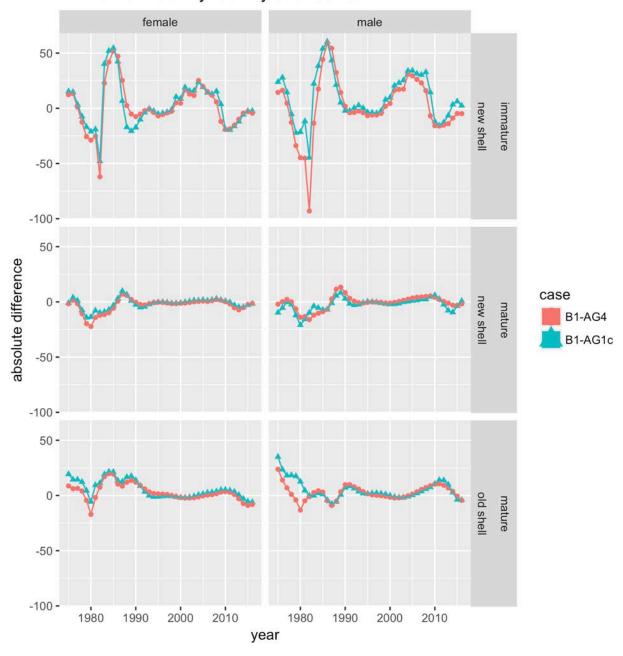


Figure 38. Differences for NMFS trawl survey: survey abundance.

NMFS trawl survey survey abundance for female immature new shell 000 000 000 150 -000 000 000 - - - - 000 00000000 000 100 -00.00 0000 0 . 000000 50 -00000 20 30 percent . . . 00000 difference 00000 00000 . . . (00000 <0 00000 0 0 0 0 >=0 150 -00 - 00 - - 00 - 000 00 - 00 - - - 00 - 000 000000.000.000 0000000 000000 00.00...00.000 100 -. 000000 0000000 0000000 0000000 000000 50 -.000.0000.0.000.000000000000.00... 0.00. - 0000 00000 - - 0000 - - 0000000000 1980 1990 2000 2010

Figure 39. Differences for NMFS trawl survey survey abundance for female immature new shell.

NMFS trawl survey survey abundance for female mature new shell 00000 00000 00000 150 -100 -- 0 - 00000 0 0 0 0 0 0 0 10 50 -20 30 0000.0.0.0.000...0.00.00000.00.00.0 40 percent difference <0 150 ->=0 0.000.0000.0000.00000000 00.000000000 00000000 000 - 00000 00 - - 00000 0000000 100 -0 . 0 . 0 0 0 0 0 0 . 0 . 0 0 0 0 0 0000 - 00000 - 0000 - 0000 - 0000 - 0000 000000000 0.00...000...000...0...000...000 0000.00000.00000.0000.0000.00000 0000000 0 0 0 0 0 0 0 50 -00000 880000 1990 1980 2000 2010

Figure 40. Differences for NMFS trawl survey survey abundance for female mature new shell.

NMFS trawl survey survey abundance for female mature old shell ••••••••••••••• 150 -••••••••••••••••••••••••••• 100 -........000.00........................ 0000 . . . 00000 . . . 40 percent difference <0 150 -......... 100 -0000.000000000000.................. 50 -1980 1990 2000 2010

Figure 41. Differences for NMFS trawl survey survey abundance for female mature old shell.

NMFS trawl survey survey abundance for male immature new shell 00000000000000 0000000000000 000000000000 000000000000 000000000000 00000-00-00 150 -00000000000 100 -0000000 10 30 40 .00................. percent difference <0 150 ->=0 100 -00000.0000.0000.0000000000000 50 -

Figure 42. Differences for NMFS trawl survey survey abundance for male immature new shell.

2000

2010

1990

NMFS trawl survey survey abundance for male mature new shell 0.00............................... 0 . . 0 0 . 0 0 0 0 0 - 0 0 0 0 0 0 0 0 0 150 -100 -10 50 -20 30 40 0000 percent difference <0 150 ->=0 100 -50 -

Figure 43. Differences for NMFS trawl survey survey abundance for male mature new shell.

2000

2010

1990

for male mature old shell 000···**000**···**0000·0000**00000000 150 -0000-0-000000000000----------100 -0000....0000..000000............ 0000 - • • 0000 • • 000000000 • • • • 10 20 30 40 percent difference <0 150 ->=0 100 -00000...00...000................. 00000-0000-0000000000000----••••••••••• 50 -1990 2000 2010 1980

NMFS trawl survey survey abundance

Figure 44. Differences for NMFS trawl survey survey abundance for male mature old shell.

NMFS trawl survey survey abundance for female immature new shell 150 -100 -15 20 absolute difference <0 150 -100 -50 -

Figure 45. Differences for NMFS trawl survey survey abundance for female immature new shell.

1990

1980

2000

NMFS trawl survey survey abundance for female mature new shell 150 -100 absolute difference <0 150 -100 -50 -

Figure 46. Differences for NMFS trawl survey survey abundance for female mature new shell.

2000

2010

1990

NMFS trawl survey survey abundance for female mature old shell 150 -100 -50 absolute difference <0 150 -100 -50 -1980 1990 2000 2010

Figure 47. Differences for NMFS trawl survey survey abundance for female mature old shell.

NMFS trawl survey survey abundance for male immature new shell 150 -100 -10 15 absolute difference <0 150 -.00.00.000.00000000.............. 100 -50 -

Figure 48. Differences for NMFS trawl survey survey abundance for male immature new shell.

1990

1980

2000

NMFS trawl survey survey abundance for male mature new shell 150 -100 -0.5 1.0 1.5 2.0 absolute difference <0 150 ->=0 100 -50 -1980 1990 2000 2010

Figure 49. Differences for NMFS trawl survey survey abundance for male mature new shell.

NMFS trawl survey survey abundance for male mature old shell 150 -100 -50 absolute difference <0 150 -00000 - 000 100 -50 -1980 1990 2000 2010

Figure 50. Differences for NMFS trawl survey survey abundance for male mature old shell.

Survey biomass

NMFS trawl survey: survey biomass

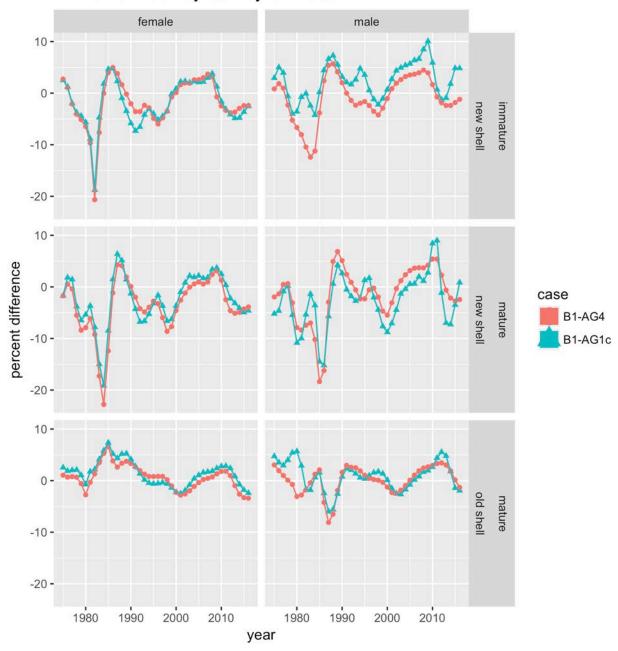


Figure 51. Differences for NMFS trawl survey: survey biomass.

NMFS trawl survey: survey biomass

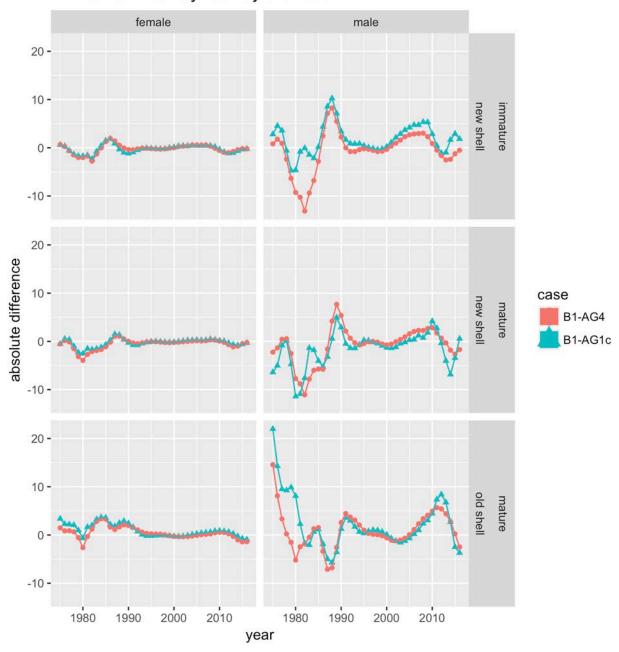


Figure 52. Differences for NMFS trawl survey: survey biomass.

Fisheries

Fishery catchability

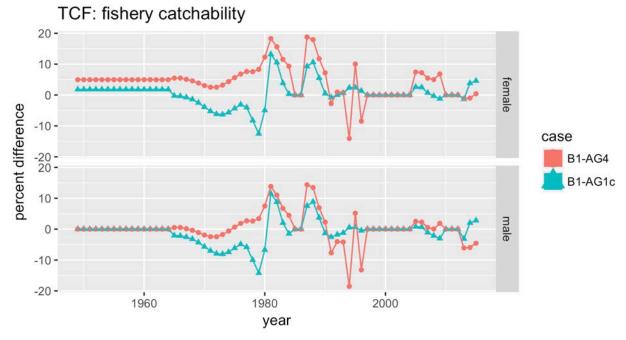


Figure 53. Differences for TCF: fishery catchability.

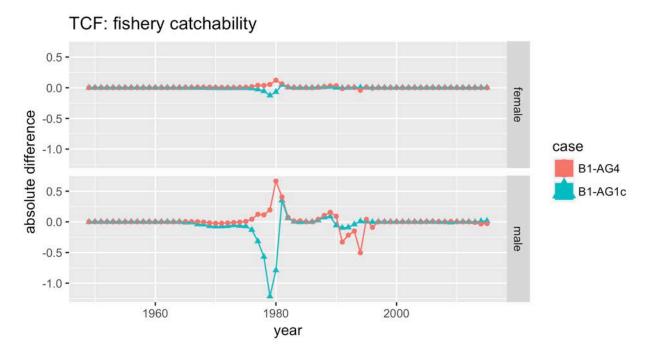


Figure 54. Differences for TCF: fishery catchability.

SCF: fishery catchability 5 female 0 percent difference -5 case -10 -B1-AG4 B1-AG1c 5 -0 --5 **-**-10 **-**2000 1960 1980

year

Figure 55. Differences for SCF: fishery catchability.

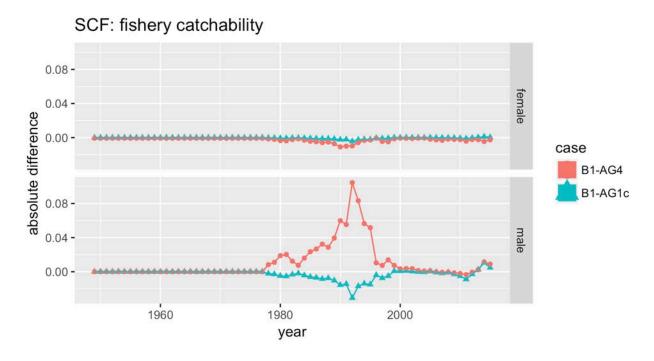


Figure 56. Differences for SCF: fishery catchability.

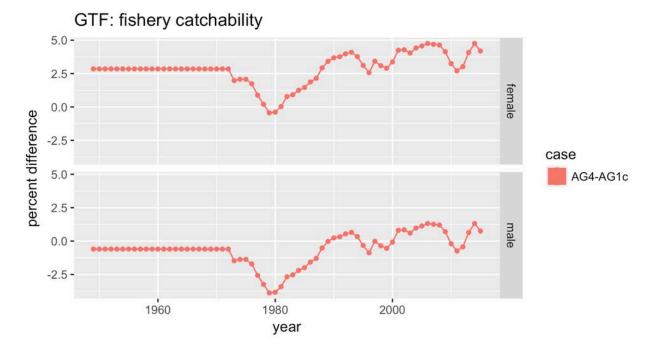


Figure 57. Differences for GTF: fishery catchability.

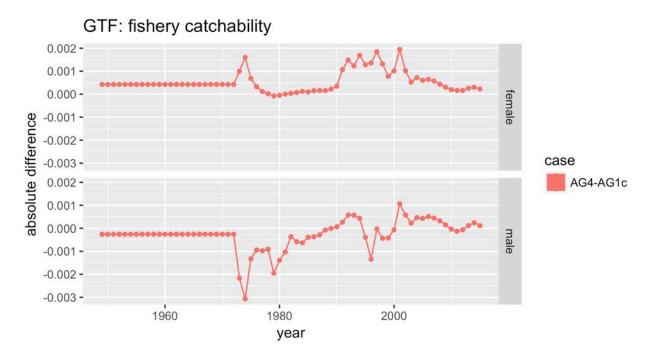


Figure 58. Differences for GTF: fishery catchability.

RKF: fishery catchability 4 female 2 percent difference case -2 -B1-AG4 6 -B1-AG1c 4 -2 -0 --2 -1960 1980 2000 year

Figure 59. Differences for RKF: fishery catchability.

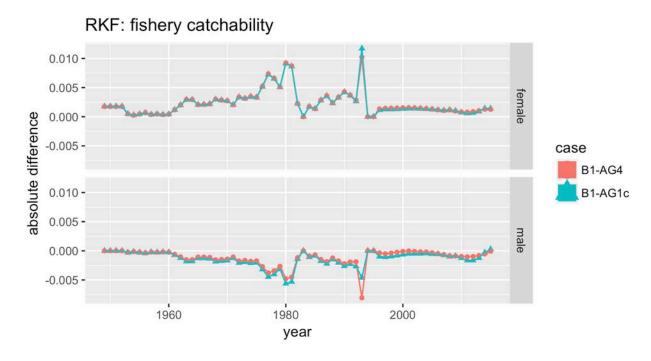


Figure 60. Differences for RKF: fishery catchability.

Total selectivity functions

TCF fishery selectivity for female all maturity all shell

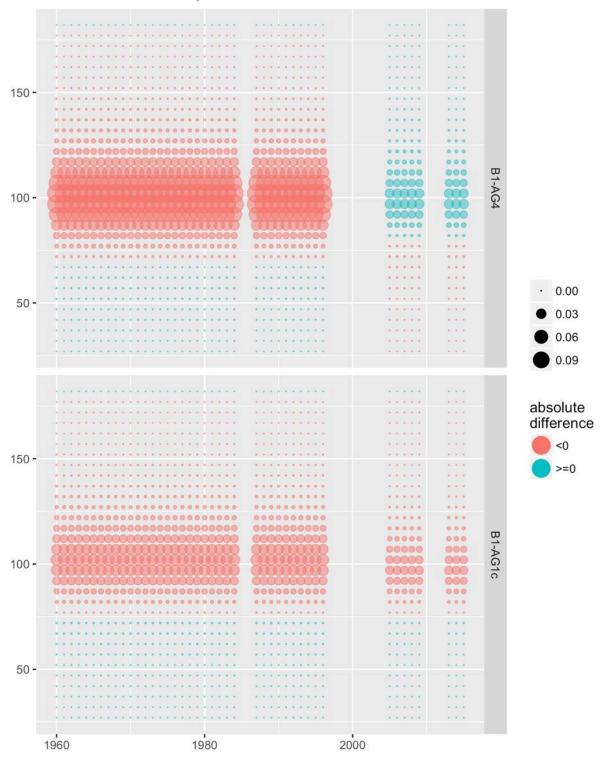


Figure 61. Differences for TCF fishery selectivity for female all maturity all shell.

TCF fishery selectivity for male all maturity all shell 000000000 000000000000000000000000 000000000000 0 0 + 0 00000 150 -00000 ... 0000-.... 100 -..... 0000 0000 0000000000000000000000000 0000 0.0 0000 50 -0000 0.2 0.3 absolute difference <0 150 -........ >=0 ------. 00.0. 0000. 0000. 000 .. 000 000 . . 000 100 -. 50 -

2000

Figure 62. Differences for TCF fishery selectivity for male all maturity all shell.

1980

TCF females: fishery selectivity 1960 1961 1962 1963 1964 0.00 -4 -0.04 **-**-0.12 -1965 1966 1967 1968 1969 0.00 **-**** -0.04 **-**-0.08 --0.12 -1972 1970 1971 1973 1974 0.00 -4 -0.04 --0.08 **-**1975 1976 1977 1978 1979 0.00 -4 -0.04 --0.08 --0.12 absolute difference 1980 1981 1982 1983 1984 case 0.00 -B1-AG4 -0.08 **-**B1-AG1c 1987 1988 1989 1990 1991 0.00 -4 -0.04 --0.08 --0.12 -1992 1993 1994 1995 1996 0.00 **-**-0.04 **-**-0.08 **-**-0.12 -2005 2006 2007 2008 2009 0.00 --0.04 --0.08 **-**-0.12 **-**50 100 150 50 100 150 2013 2014 2015 0.00 --0.04 --0.08 --0.12 **-**50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 63. Differences for TCF females: fishery selectivity.

TCF males: fishery selectivity 1961 1960 1962 1963 1964 0.4 -0.2 -0.0 -1965 1966 1967 1968 1969 0.4 -0.2 -0.0 -1970 1971 1972 1973 1974 0.4 -0.2 -0.0 -1975 1976 1977 1978 1979 0.4 -0.2 -0.0 absolute difference 1980 1981 1982 1983 1984 case B1-AG4 B1-AG1c 1987 1988 1989 1990 1991 0.2 -0.0 1993 1994 1995 1996 1992 0.4 -0.2 -0.0 2005 2006 2007 2008 2009 0.4 -0.2 -0.0 -50 100 150 50 100 150 2015 2013 2014 0.4 -0.2 -0.0 -50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 64. Differences for TCF males: fishery selectivity.

SCF fishery selectivity for female all maturity all shell

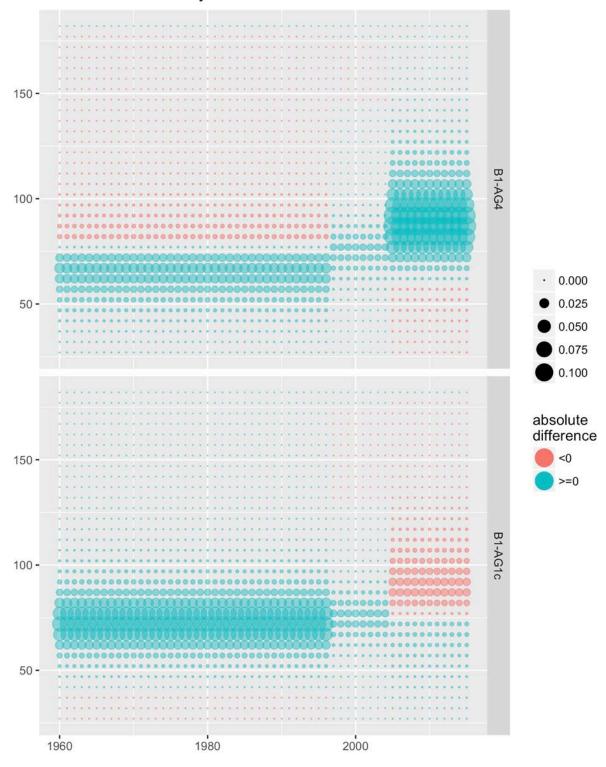


Figure 65. Differences for SCF fishery selectivity for female all maturity all shell.

SCF fishery selectivity for male all maturity all shell

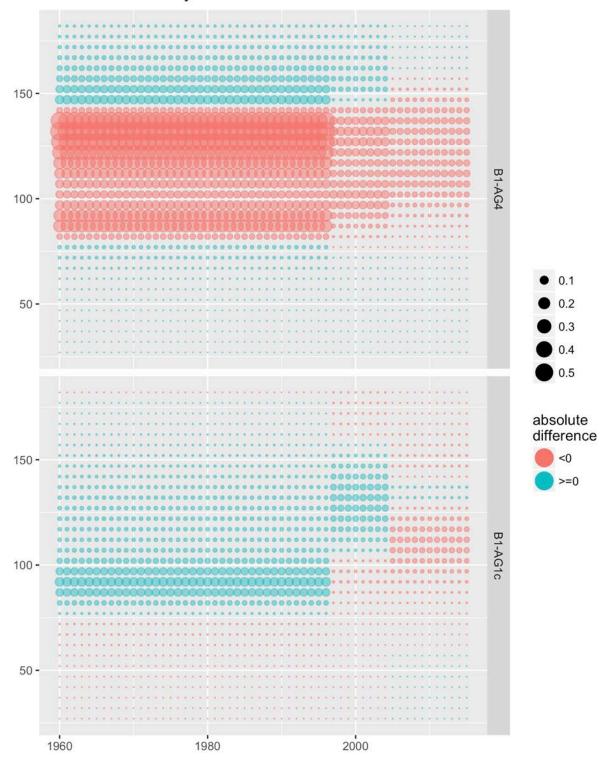


Figure 66. Differences for SCF fishery selectivity for male all maturity all shell.



Figure 67. Differences for SCF females: fishery selectivity.

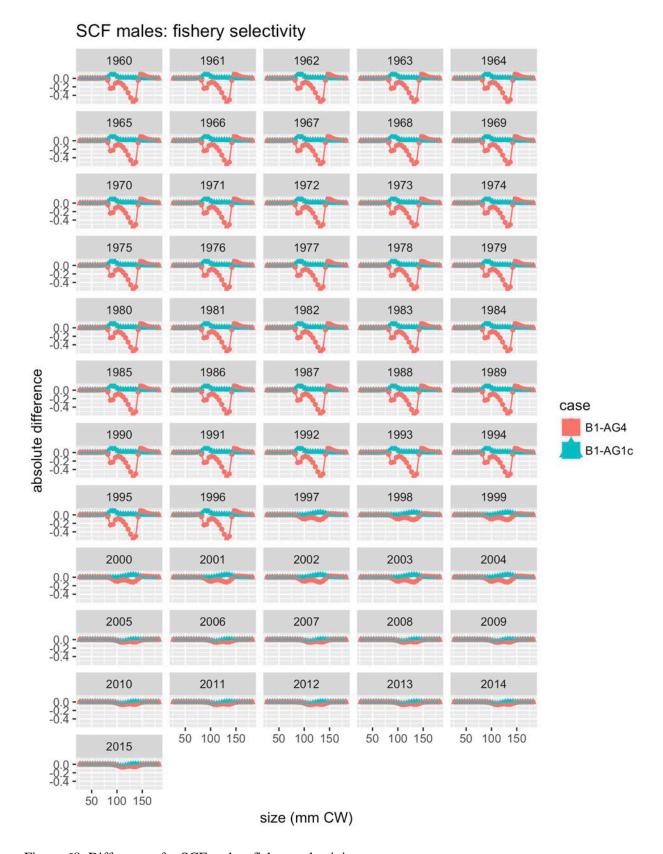


Figure 68. Differences for SCF males: fishery selectivity.

GTF fishery selectivity for female all maturity all shell

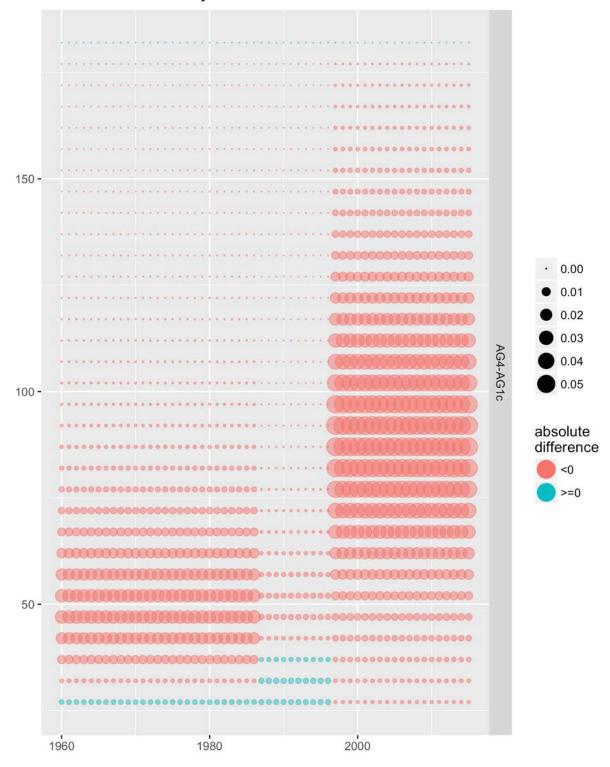


Figure 69. Differences for GTF fishery selectivity for female all maturity all shell.

GTF fishery selectivity for male all maturity all shell

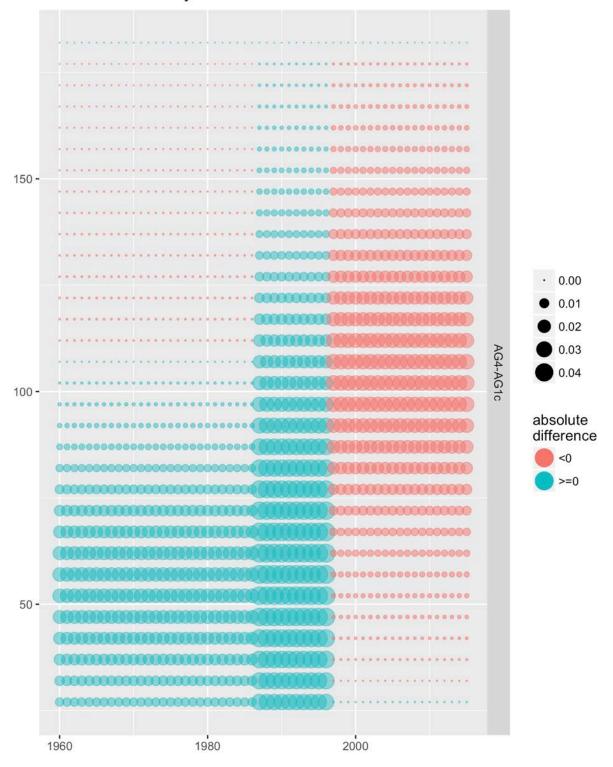


Figure 70. Differences for GTF fishery selectivity for male all maturity all shell.

GTF females: fishery selectivity 0.00 **-**-0.02 **-**-0.04 **-**absolute difference 0.00 -0.02 -0.04 case AG4-AG1c 0.00 **-**-0.02 **-**-0.04 **-**0.00 **-**-0.02 **-**-0.04 **-**50 100 150 50 100 150 50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 71. Differences for GTF females: fishery selectivity.

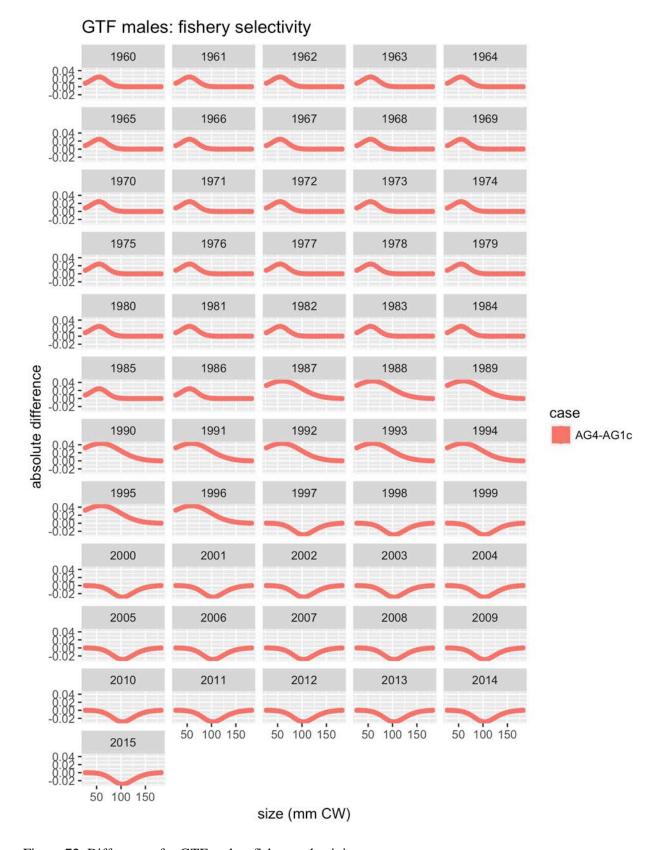


Figure 72. Differences for GTF males: fishery selectivity.

RKF fishery selectivity for female all maturity all shell

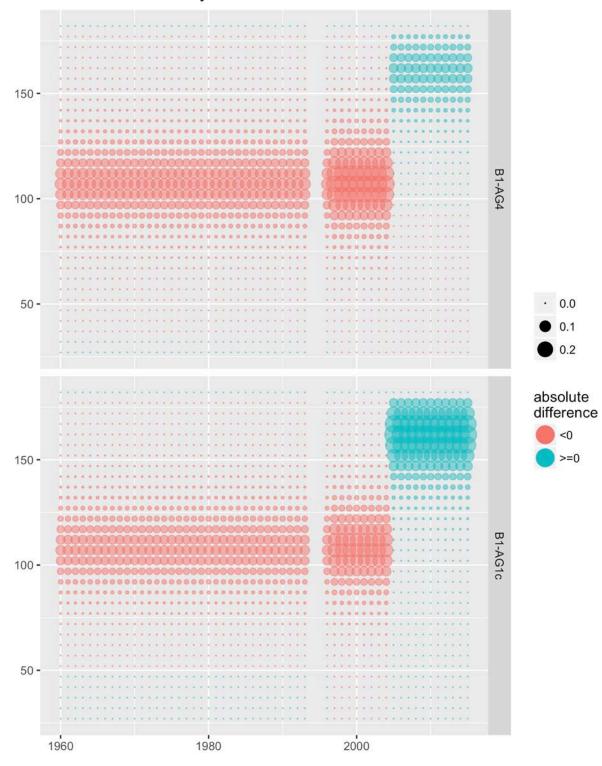


Figure 73. Differences for RKF fishery selectivity for female all maturity all shell.

RKF fishery selectivity for male all maturity all shell 000000000...... 000000000-----000000000....... 150 -00000000-----00000000........ 00000000....... 000000000...... 0000000000...... 100 -............. .00000000....... 0.000 0.004 50 -0.008 0.012 0.016 absolute difference 00000000------<0 150 -00000000000000000000 00000000000000000 00000000000000000 00000000000000 8008888000000000000 00000000000000000 00000000000000000000 000000000000000000000 100 -.00000000........ 50 -

2000

Figure 74. Differences for RKF fishery selectivity for male all maturity all shell.

1980

RKF females: fishery selectivity absolute difference case B1-AG4 B1-AG1c 50 100 150 50 100 150 50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 75. Differences for RKF females: fishery selectivity.

RKF males: fishery selectivity 0.01 **-**0.00 **-**-0.01 **-**0.01 **-** 0.00 **-**4 -0.01 **-**0.01 **-**0.00 **-**-0.01 **-**0.01 -0.00 -0.01 --0.01 absolute difference case 0.01 **-**0.00 **-**-0.01 **-**B1-AG4 B1-AG1c 0.01 --0.01 -0.01 -0.00 -4 -0.01 -0.01 **-** 0.00 **-**-0.01 -0.01 -0.00 -50 100 150 0.01 0.00 --0.01 -50 100 150 50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 76. Differences for RKF males: fishery selectivity.

Retention functions

TCF fishery retention for male all maturity all shell

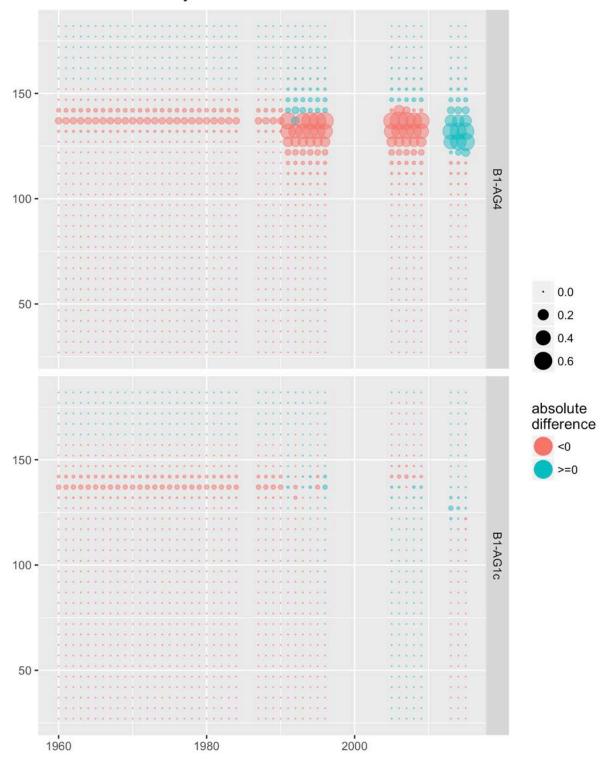


Figure 77. Differences for TCF fishery retention for male all maturity all shell.

TCF males: fishery retention 1961 1960 1962 1963 1964 0.4 -0.0 -4 -0.4 -1965 1966 1967 1968 1969 0.4 -0.0 -4 -0.4 -1970 1971 1972 1973 1974 0.4 -0.0 --0.4 -1975 1976 1977 1978 1979 0.4 -0.0 -0.4 absolute difference 1980 1981 1982 1983 1984 case 0.4 -B1-AG4 -0.4 -B1-AG1c 1988 1989 1987 1990 1991 0.4 -0.0 -0.4 -1992 1993 1994 1995 1996 0.4 -0.0 --0.4 -2005 2006 2007 2008 2009 0.4 -0.0 -0.4 -50 100 150 50 100 150 2013 2014 2015 0.4 --0.4 -50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 78. Differences for TCF males: fishery retention.

Total catch abundance

TCF: fishery catch abundance

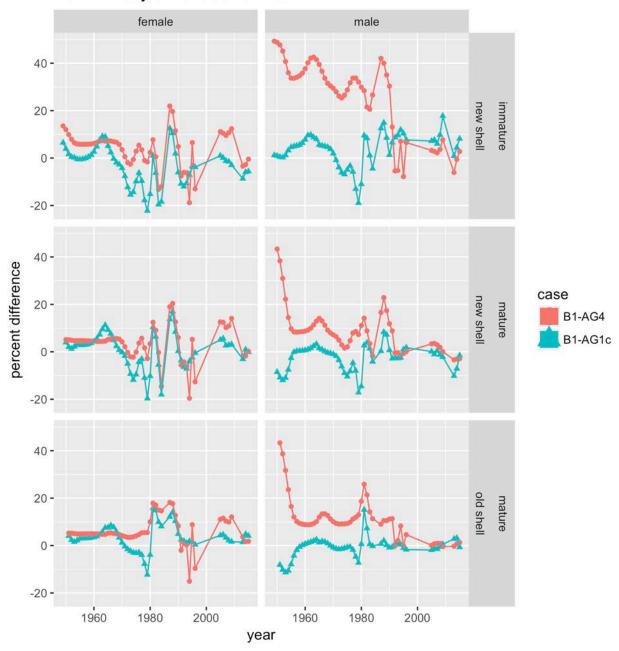


Figure 79. Differences for TCF: fishery catch abundance.

TCF: fishery catch abundance

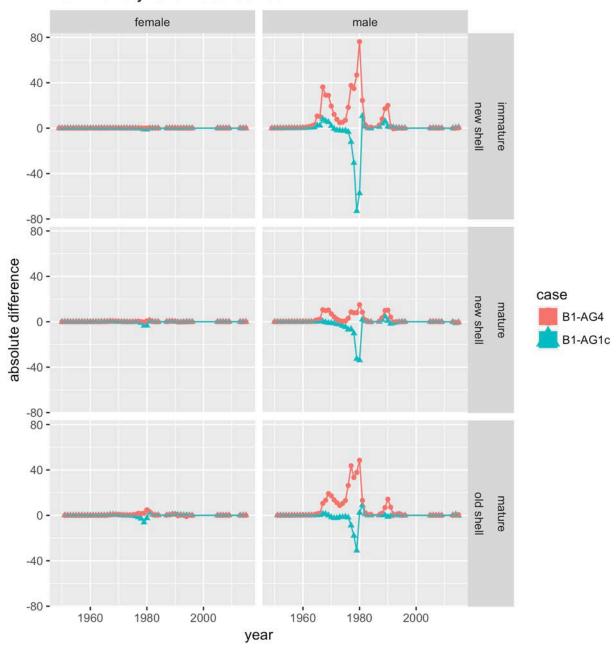


Figure 80. Differences for TCF: fishery catch abundance.

SCF: fishery catch abundance

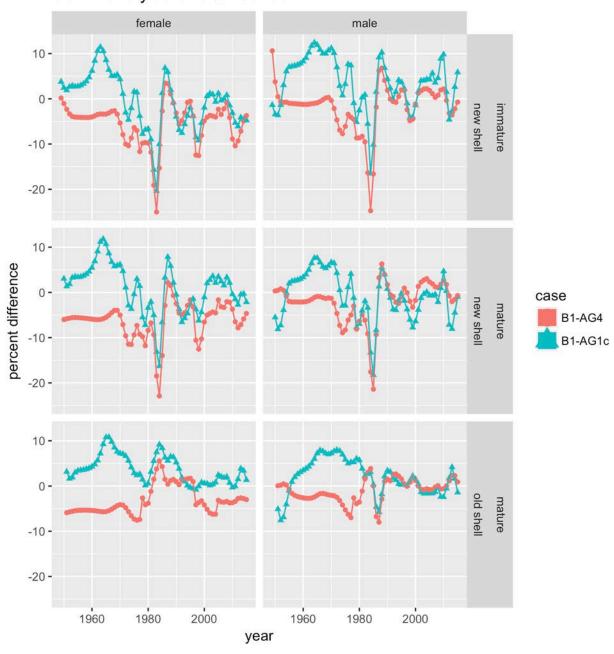


Figure 81. Differences for SCF: fishery catch abundance.

SCF: fishery catch abundance

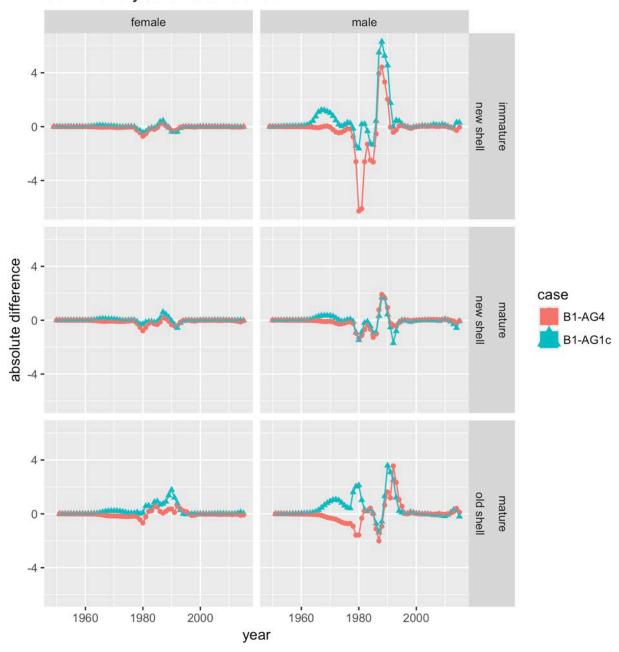


Figure 82. Differences for SCF: fishery catch abundance.

GTF: fishery catch abundance

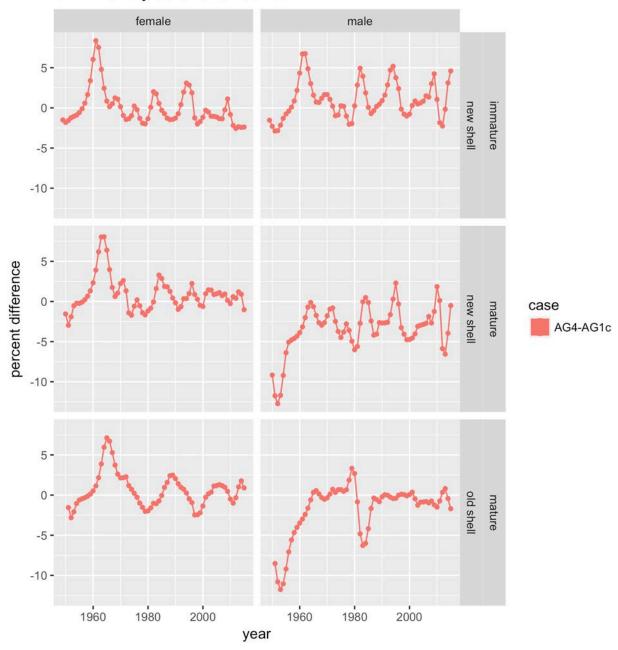


Figure 83. Differences for GTF: fishery catch abundance.

GTF: fishery catch abundance

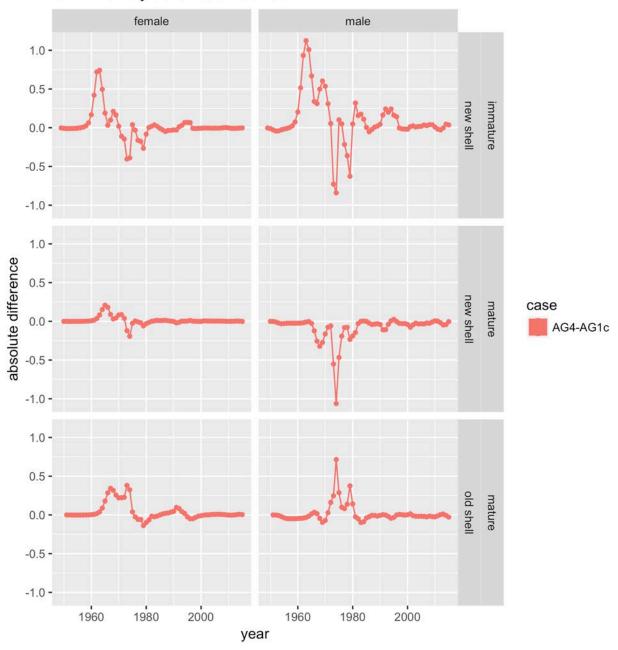


Figure 84. Differences for GTF: fishery catch abundance.

RKF: fishery catch abundance

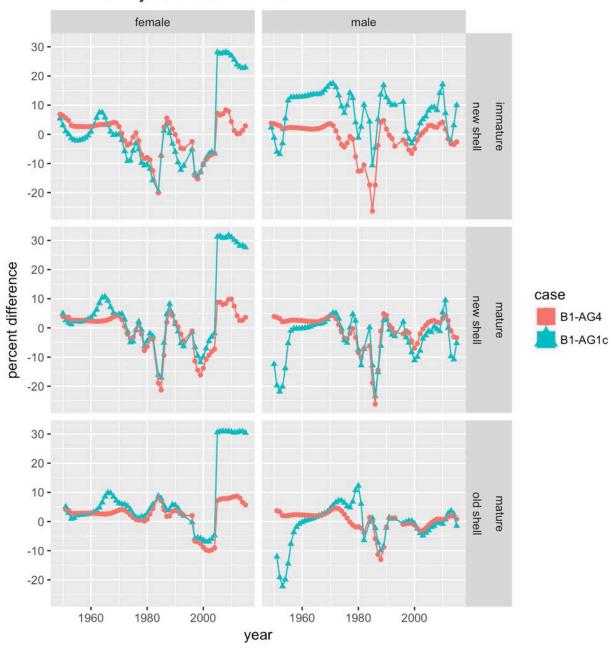


Figure 85. Differences for RKF: fishery catch abundance.

RKF: fishery catch abundance

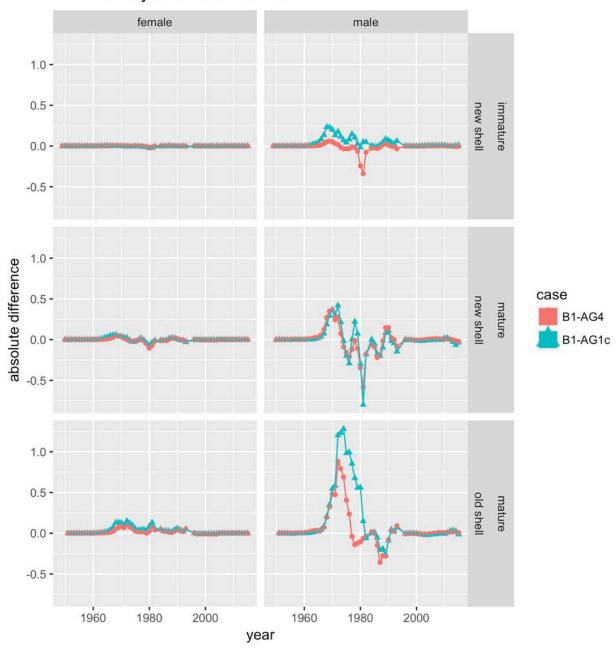


Figure 86. Differences for RKF: fishery catch abundance.

TCF fishery catch abundance for female immature new shell 150 -100 -50 -20 30 percent difference <0 >=0 150 -100 -50 -

Figure 87. Differences for TCF fishery catch abundance for female immature new shell.

1980

2000

TCF fishery catch abundance for female mature new shell 150 -100 -10 50 -20 30 40 percent difference <0 150 ->=0 100 -50 -

Figure 88. Differences for TCF fishery catch abundance for female mature new shell.

1980

2000

TCF fishery catch abundance for female mature old shell 000 150 -00 -000 ... 100 -10 50 -20 30 40 percent difference <0 150 ->=0 100 -50 -1960 1980 2000

Figure 89. Differences for TCF fishery catch abundance for female mature old shell.

TCF fishery catch abundance for male immature new shell

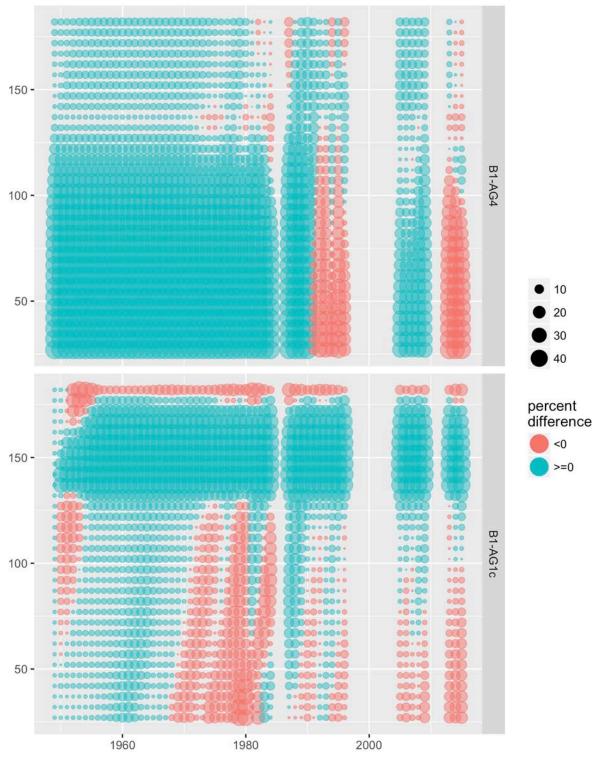


Figure 90. Differences for TCF fishery catch abundance for male immature new shell.

TCF fishery catch abundance for male mature new shell

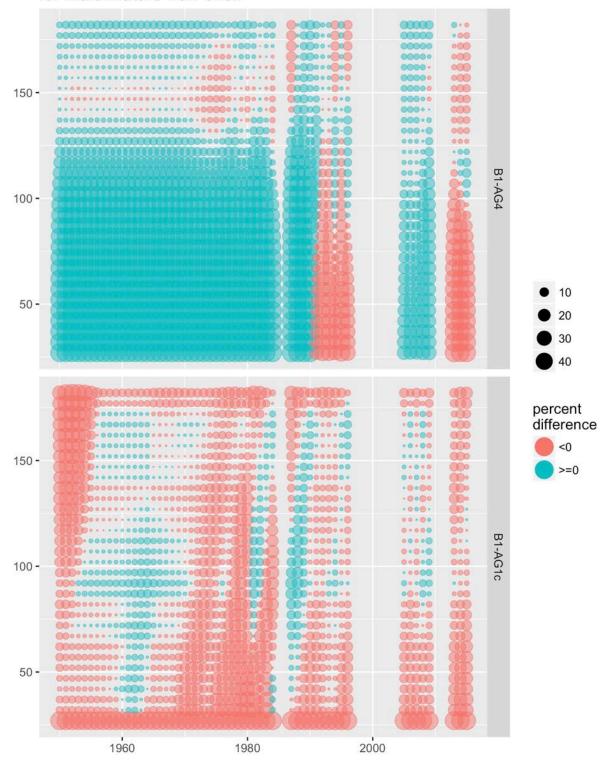


Figure 91. Differences for TCF fishery catch abundance for male mature new shell.

TCF fishery catch abundance for male mature old shell

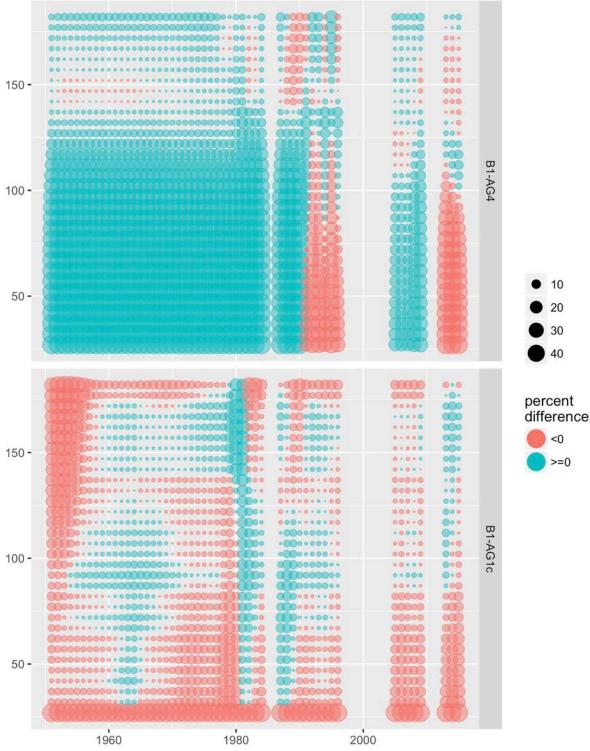


Figure 92. Differences for TCF fishery catch abundance for male mature old shell.

TCF fishery catch abundance for female immature new shell 150 -100 -******** ------....... 50 -0.2 0.3 absolute difference <0 150 -100 -........ 50 -1960 1980 2000

Figure 93. Differences for TCF fishery catch abundance for female immature new shell.

TCF fishery catch abundance for female mature new shell 150 -........0000000 100 -.000000000 -------........ 0.2 50 -8.0 absolute difference <0 150 -.........0000000 100 -0000000000.000... -------.......

Figure 94. Differences for TCF fishery catch abundance for female mature new shell.

1980

2000

50 -

TCF fishery catch abundance for female mature old shell 150 -........ 000000000 100 -000000000 0000000 50 absolute difference >=0 150 -........ 100 -.00000000000000... 50 -

Figure 95. Differences for TCF fishery catch abundance for female mature old shell.

1980

1960

TCF fishery catch abundance for male immature new shell 150 -......0000.... 00000 100 -00000000000 50 -...... 5.0 7.5 absolute difference <0 150 -.......000.....000000 100 -....... 80...

........

2000

Figure 96. Differences for TCF fishery catch abundance for male immature new shell.

1980

1960

50 -

TCF fishery catch abundance for male mature new shell

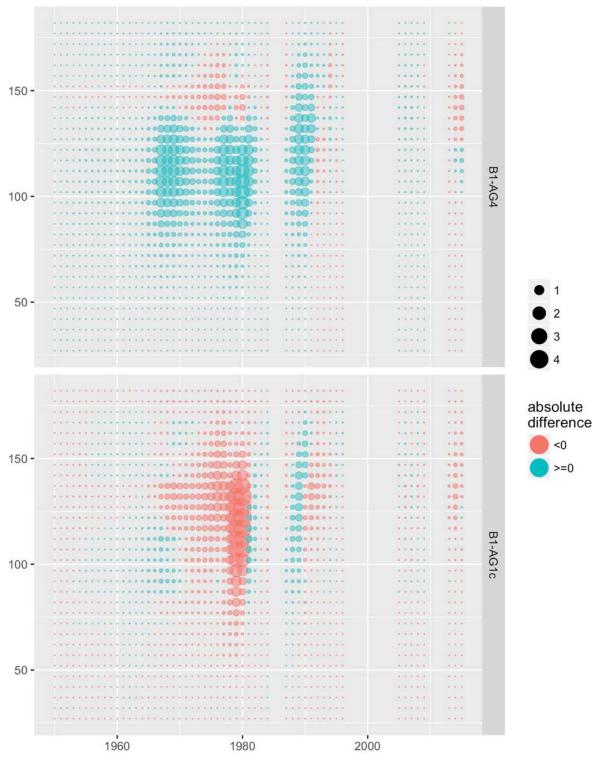


Figure 97. Differences for TCF fishery catch abundance for male mature new shell.

TCF fishery catch abundance for male mature old shell 150 -..... ----....00000000000000 100 -............... 50 -absolute difference ****** 150 -..00.00... ****** ******* 100 -....... 50 -

Figure 98. Differences for TCF fishery catch abundance for male mature old shell.

1980

1960

SCF fishery catch abundance for female immature new shell 150 -100 -50 -20 30 percent difference <0 >=0 150 -100 -50 -1980 2000 1960

Figure 99. Differences for SCF fishery catch abundance for female immature new shell.

SCF fishery catch abundance for female mature new shell 150 -100 -10 50 -30 40 percent difference <0 150 ->=0 100 -50 -1980 2000 1960

Figure 100. Differences for SCF fishery catch abundance for female mature new shell.

SCF fishery catch abundance for female mature old shell 150 -100 -50 -40 percent difference <0 150 -100 -50 -1960 1980 2000

Figure 101. Differences for SCF fishery catch abundance for female mature old shell.

SCF fishery catch abundance for male immature new shell

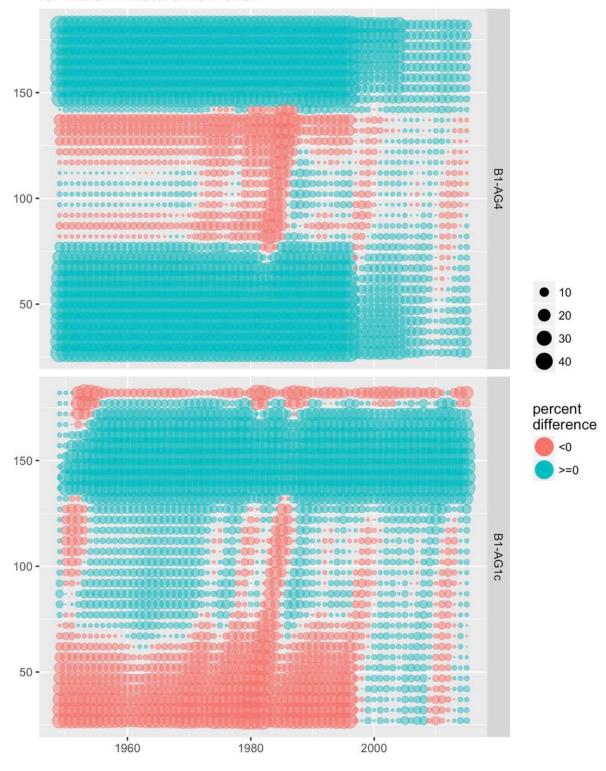


Figure 102. Differences for SCF fishery catch abundance for male immature new shell.

SCF fishery catch abundance for male mature new shell

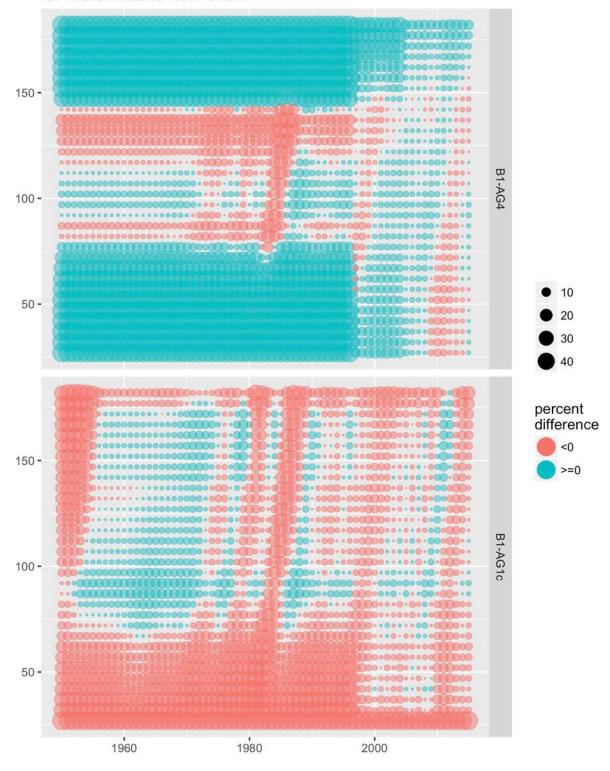


Figure 103. Differences for SCF fishery catch abundance for male mature new shell.

SCF fishery catch abundance for male mature old shell

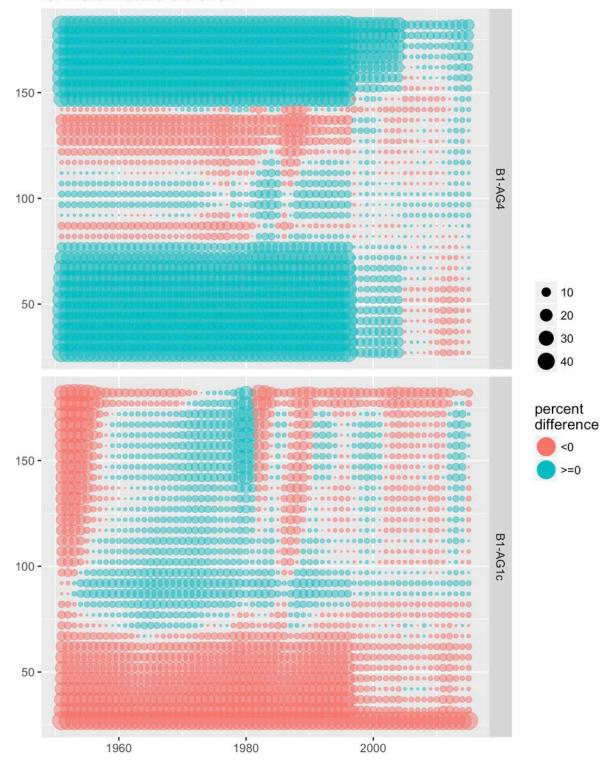


Figure 104. Differences for SCF fishery catch abundance for male mature old shell.

SCF fishery catch abundance for female immature new shell 150 -100 -......... ------------0.05 50 -0.10 0.15 absolute difference <0 150 -100 -

Figure 105. Differences for SCF fishery catch abundance for female immature new shell.

1980

2000

50 -

SCF fishery catch abundance for female mature new shell

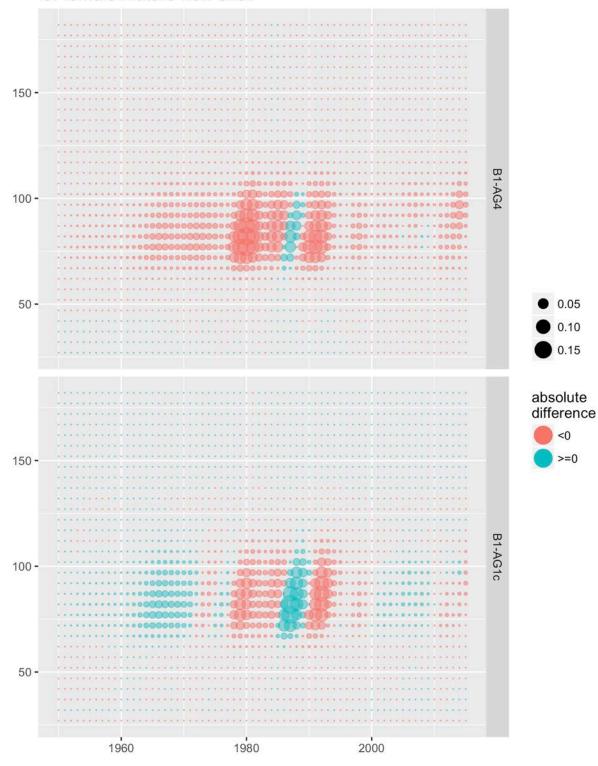


Figure 106. Differences for SCF fishery catch abundance for female mature new shell.

SCF fishery catch abundance for female mature old shell

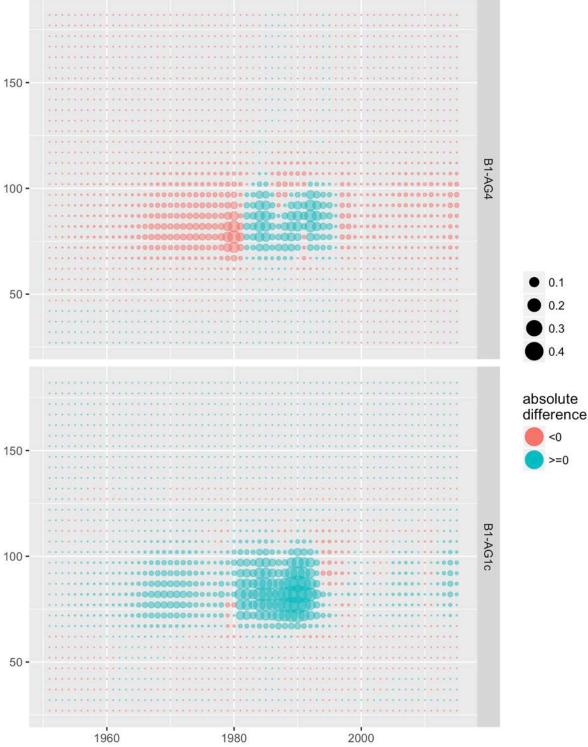


Figure 107. Differences for SCF fishery catch abundance for female mature old shell.

SCF fishery catch abundance for male immature new shell

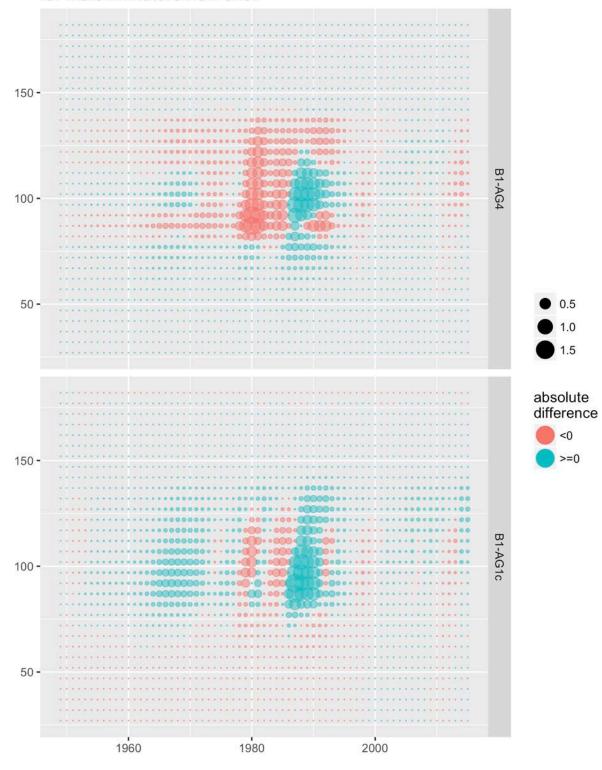


Figure 108. Differences for SCF fishery catch abundance for male immature new shell.

SCF fishery catch abundance for male mature new shell

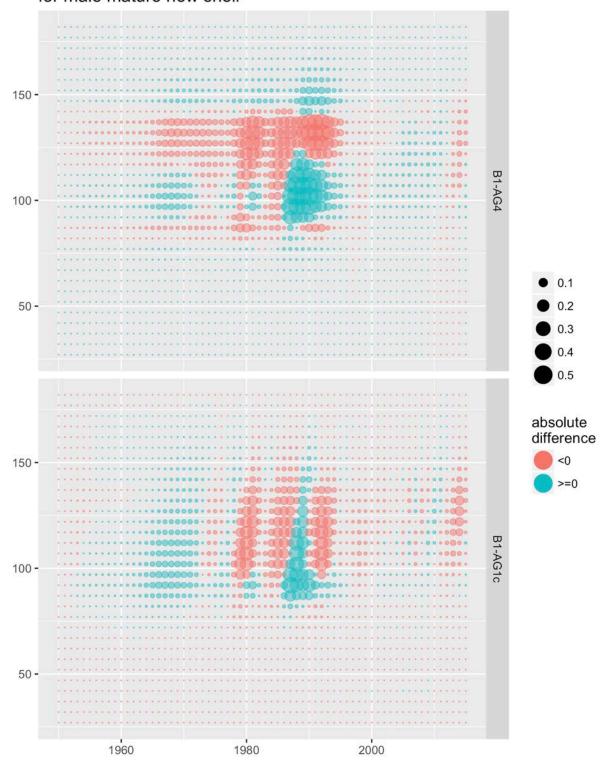


Figure 109. Differences for SCF fishery catch abundance for male mature new shell.

SCF fishery catch abundance for male mature old shell

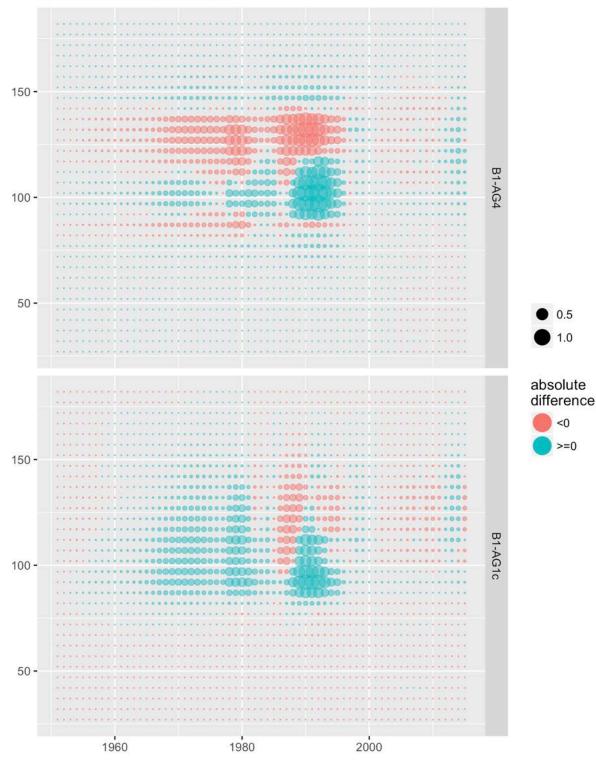


Figure 110. Differences for SCF fishery catch abundance for male mature old shell.

GTF fishery catch abundance for female immature new shell

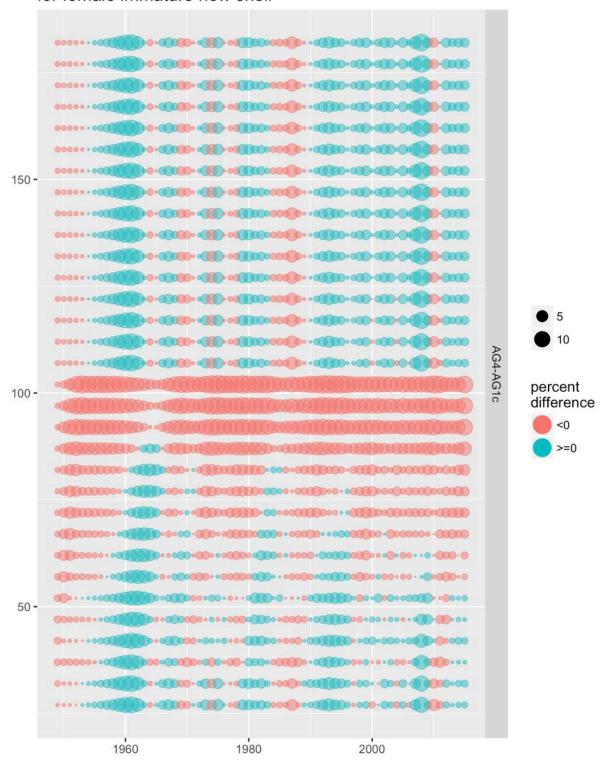


Figure 111. Differences for GTF fishery catch abundance for female immature new shell.

GTF fishery catch abundance for female mature new shell 150 -10 20 30 40 100 percent difference <0 >=0 50 -

Figure 112. Differences for GTF fishery catch abundance for female mature new shell.

1980

1960

GTF fishery catch abundance for female mature old shell 150 -10 20 30 40 100 percent difference <0 >=0 50 -

Figure 113. Differences for GTF fishery catch abundance for female mature old shell.

1980

1960

GTF fishery catch abundance for male immature new shell

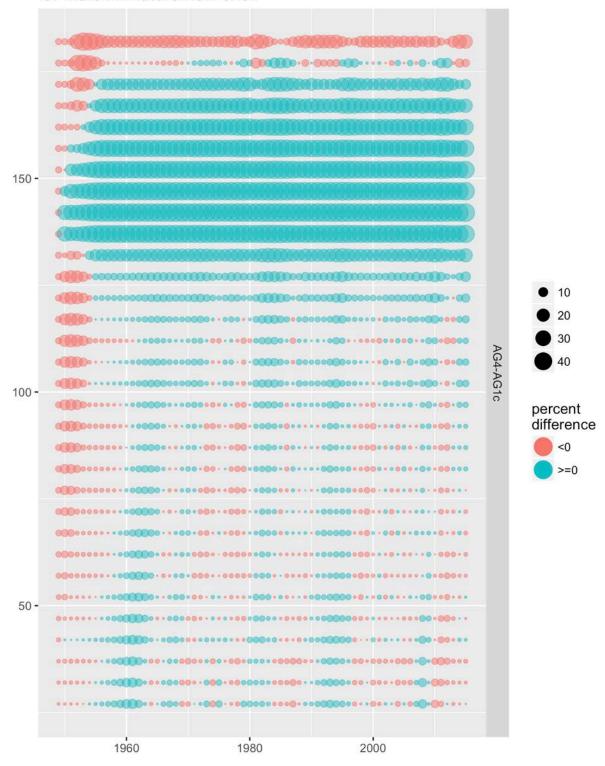


Figure 114. Differences for GTF fishery catch abundance for male immature new shell.

GTF fishery catch abundance for male mature new shell

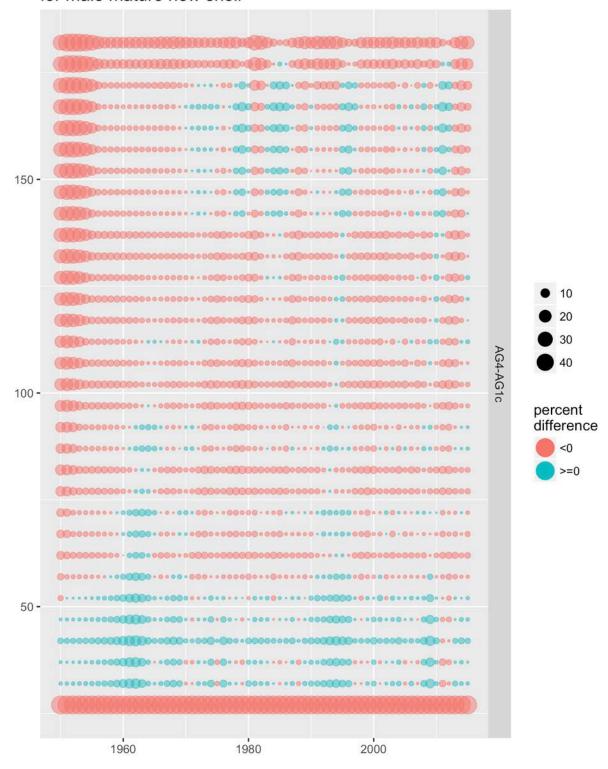


Figure 115. Differences for GTF fishery catch abundance for male mature new shell.

GTF fishery catch abundance for male mature old shell

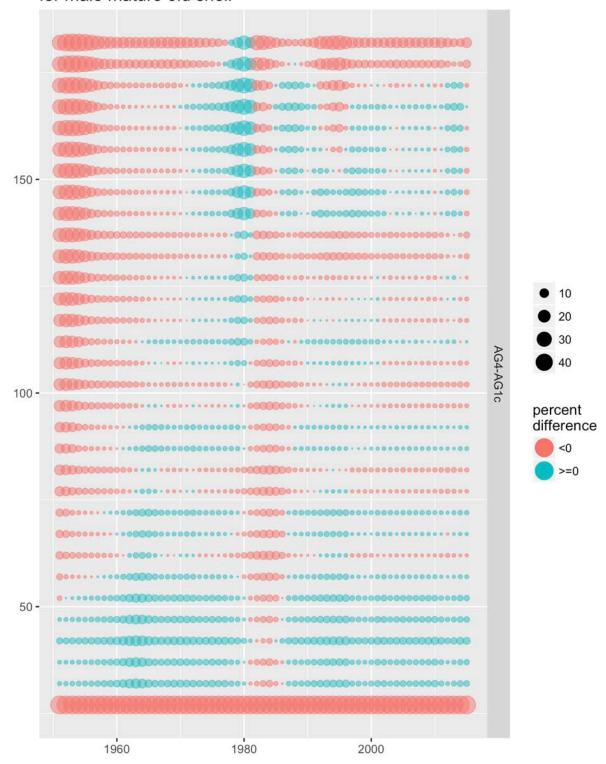


Figure 116. Differences for GTF fishery catch abundance for male mature old shell.

GTF fishery catch abundance for female immature new shell

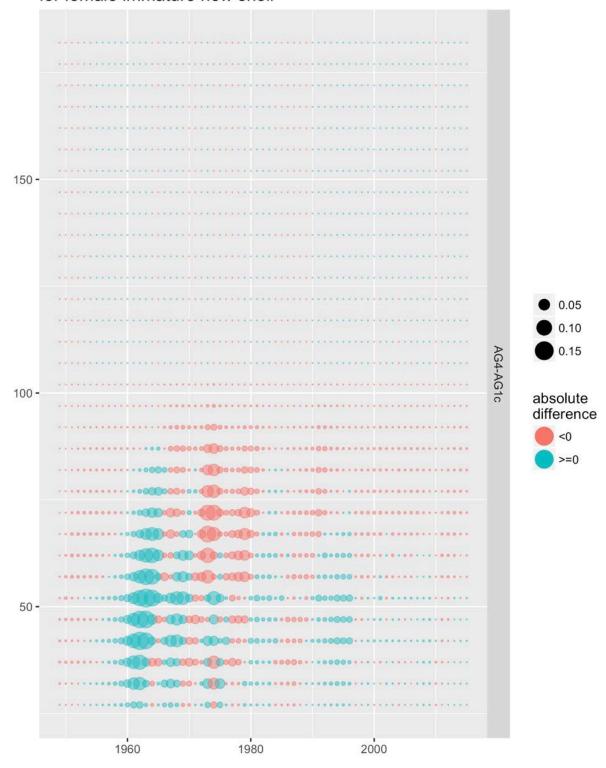


Figure 117. Differences for GTF fishery catch abundance for female immature new shell.

GTF fishery catch abundance for female mature new shell

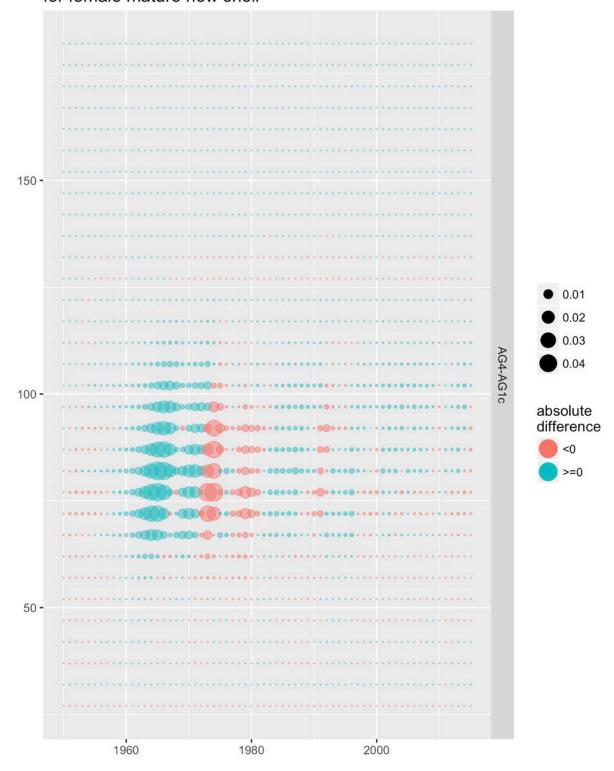


Figure 118. Differences for GTF fishery catch abundance for female mature new shell.

GTF fishery catch abundance for female mature old shell

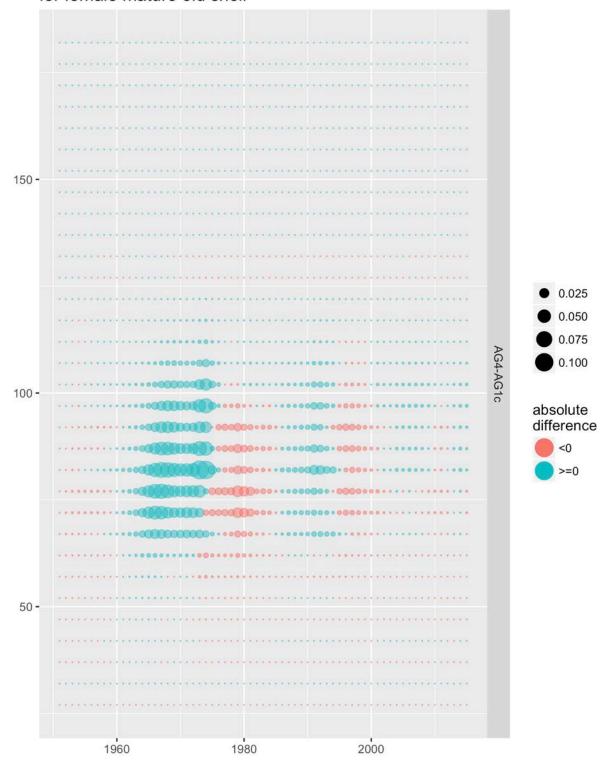


Figure 119. Differences for GTF fishery catch abundance for female mature old shell.

GTF fishery catch abundance for male immature new shell

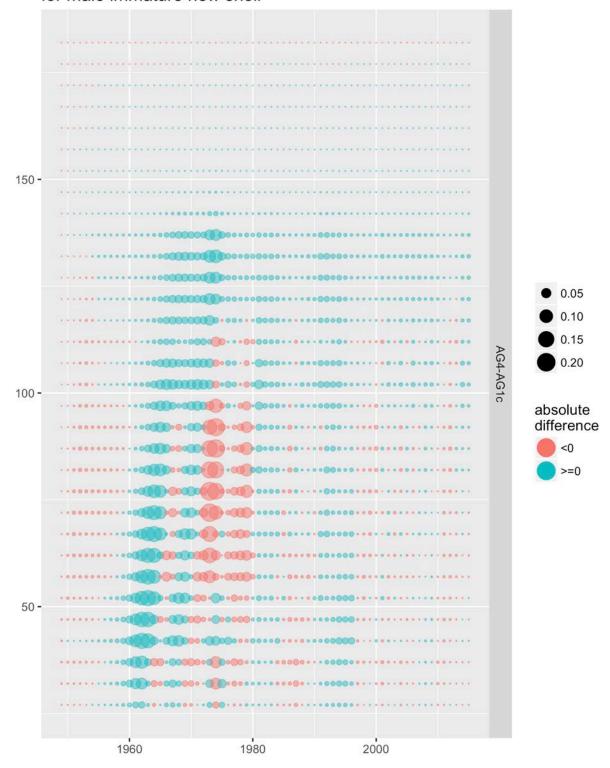


Figure 120. Differences for GTF fishery catch abundance for male immature new shell.

GTF fishery catch abundance for male mature new shell

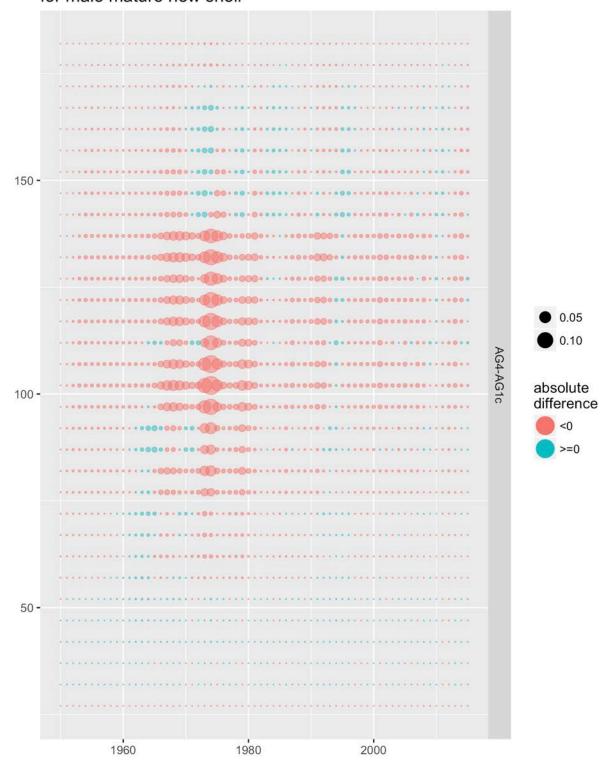


Figure 121. Differences for GTF fishery catch abundance for male mature new shell.

GTF fishery catch abundance for male mature old shell

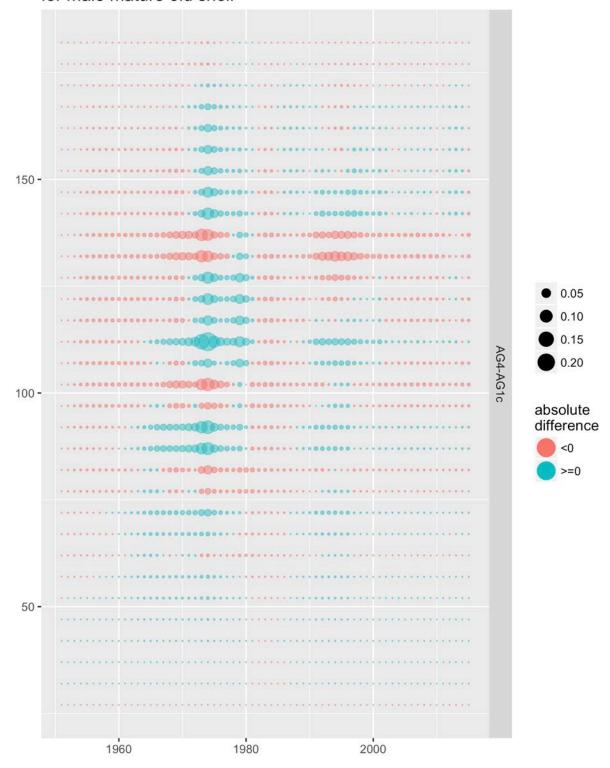


Figure 122. Differences for GTF fishery catch abundance for male mature old shell.

RKF fishery catch abundance for female immature new shell 150 -100 -50 -20 30 percent difference <0 >=0 150 -100 -50 -1960 2000 1980

Figure 123. Differences for RKF fishery catch abundance for female immature new shell.

RKF fishery catch abundance for female mature new shell 150 -100 -10 50 -30 40 percent difference <0 150 ->=0 100 -50 -1980 2000 1960

Figure 124. Differences for RKF fishery catch abundance for female mature new shell.

RKF fishery catch abundance for female mature old shell 150 -100 -50 -30 40 percent difference <0 150 ->=0 100 -50 -1960 1980 2000

Figure 125. Differences for RKF fishery catch abundance for female mature old shell.

RKF fishery catch abundance for male immature new shell 150 -100 -50 -000000000 40 percent difference <0 150 ->=0 100 -50 -1960 1980 2000

Figure 126. Differences for RKF fishery catch abundance for male immature new shell.

RKF fishery catch abundance for male mature new shell 00.00000.0000000 0 - - 0000 - - 0000 000000 60.00000.000.00 150 -00000000000000000000 0 - 00000 - 0000000000000 0.000000.000.000.00 100 -00000000000000000 10 50 -40 percent difference <0 150 ->=0 100 -0000000-000-00-00 00000 * 0000 * 00 * . 00 50 -

Figure 127. Differences for RKF fishery catch abundance for male mature new shell.

1980

2000

0000000-00000-000

1960

RKF fishery catch abundance for male mature old shell 000000 - 000 - - - 000000 00000-000000----0000 150 -0000000000000000 0000000000000000 0000--000-------00000-000-0000000 0000000000 000000000 - • • • • • • • • • • • • • 000000000000000000000 100 -------........ *********************************** 10 50 -100 000000000 40 percent difference <0 .0000000000000000 150 -................. ------0.0.00000.0000000.. ************ 100 -0000---00000000000000 00000---00000000000----0000-0000000 50 -1980 2000 1960

Figure 128. Differences for RKF fishery catch abundance for male mature old shell.

RKF fishery catch abundance for female immature new shell 150 -100 -....... 0000000000 50 -0.002 0.004 0.006 absolute difference <0 150 -......... 100 -..... 000000000 ************ ************ 00-00-0000 50 -............ 1960 1980 2000

Figure 129. Differences for RKF fishery catch abundance for female immature new shell.

RKF fishery catch abundance for female mature new shell 150 ------................. 100 -.............. 50 -0.01 0.02 absolute difference >=0 150 -................ 100 -50 -1960 1980 2000

Figure 130. Differences for RKF fishery catch abundance for female mature new shell.

RKF fishery catch abundance for female mature old shell 150 -. 100 -............ 0.01 0.02 0.03 absolute difference <0 150 -............. .00000000------100 -.00000000..... .00000000....... 50 -1960 1980 2000

Figure 131. Differences for RKF fishery catch abundance for female mature old shell.

RKF fishery catch abundance for male immature new shell 150 -0000.000.0 00000000000 000000-000 000-00---0 100 -0.02 50 -0.04 0.06 absolute difference <0 150 -100 -. 50 -

Figure 132. Differences for RKF fishery catch abundance for male immature new shell.

1980

2000

1960

RKF fishery catch abundance for male mature new shell 150 -. 0000000000 100 -50 -0.05 0.10 absolute difference 00-00-00-000-00--->=0 150 -....................... 0000000000 100 -50 -1960 1980 2000

Figure 133. Differences for RKF fishery catch abundance for male mature new shell.

RKF fishery catch abundance for male mature old shell ---------. 150 -. 100 -0.05 50 -0.10 0.15 0.20 absolute difference 100000 ...00000000 <0 1000 ---6000000 150 -**** - * 0 0 0 0 0 0 - * + 0 0 0 0 0 0 - - - - 0 0 0 0 0 0 0 0 0 0 - • • • 0 D. 100 -.......... 50 -

Figure 134. Differences for RKF fishery catch abundance for male mature old shell.

1980

2000

1960

Total catch biomass

TCF: fishery total biomass

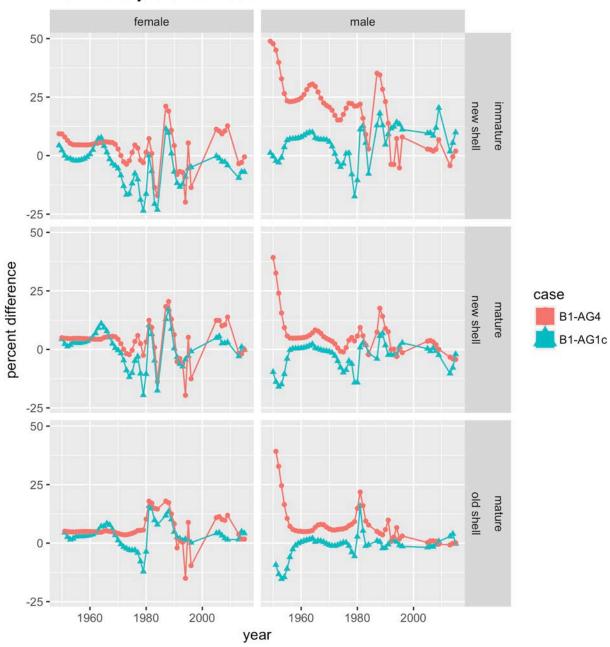


Figure 135. Differences for TCF: fishery total biomass.

TCF: fishery total biomass

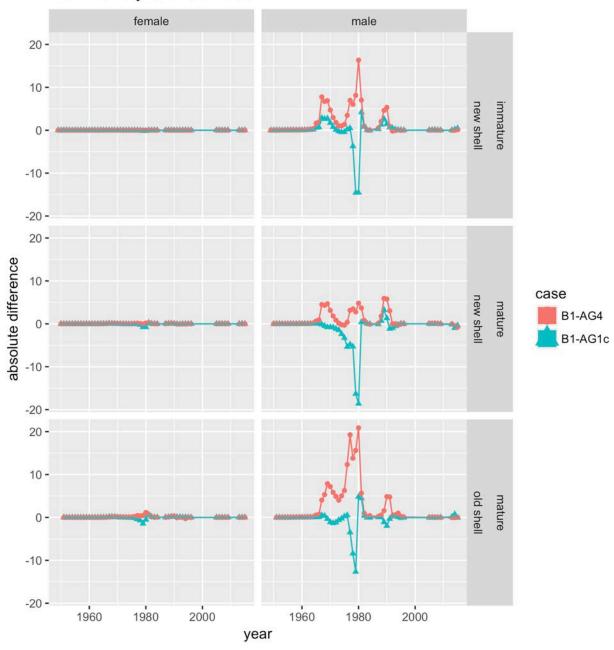


Figure 136. Differences for TCF: fishery total biomass.

SCF: fishery total biomass female male 10-0 --10 --20 **-**10percent difference 0 case new shell B1-AG4 -10 -B1-AG1c -20 -10 -0 --10 **-**-20 **-**1960 1980 2000 1980 2000 1960

Figure 137. Differences for SCF: fishery total biomass.

year

SCF: fishery total biomass

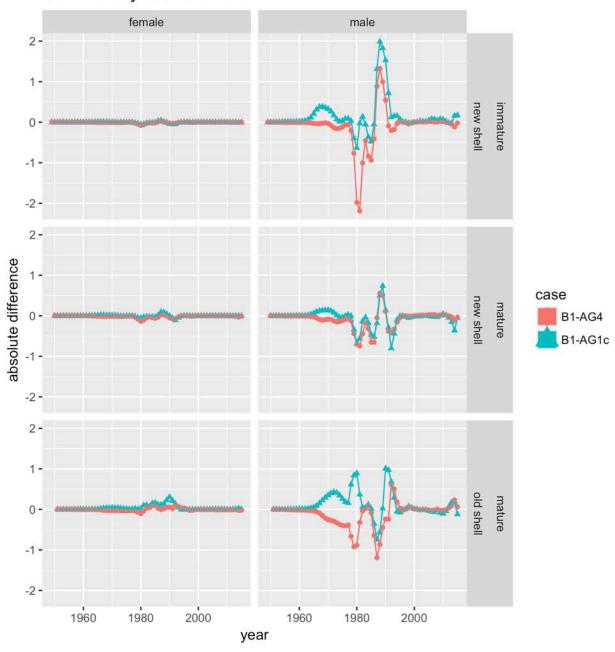


Figure 138. Differences for SCF: fishery total biomass.

GTF: fishery total biomass female male -10 percent difference case AG4-AG1c -10 -1960 1980 2000 1960 1980 2000 year

Figure 139. Differences for GTF: fishery total biomass.

GTF: fishery total biomass

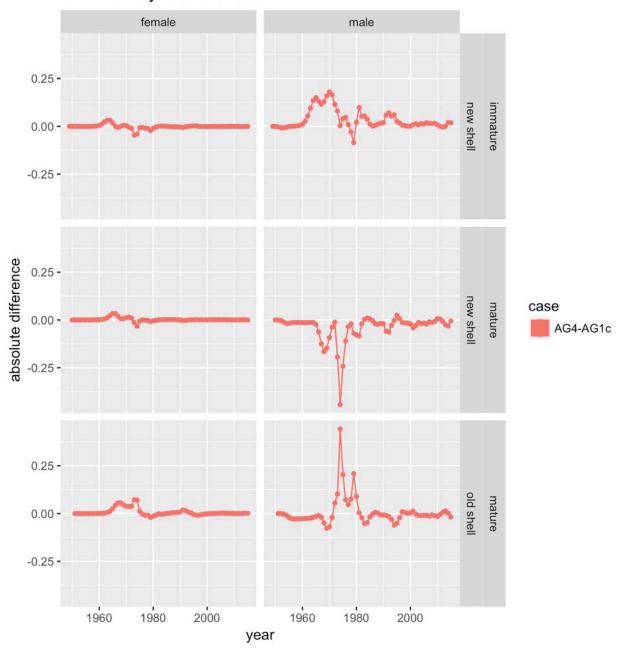


Figure 140. Differences for GTF: fishery total biomass.

RKF: fishery total biomass female male 30 -20 -10immature 0 --10 --20 -30 percent difference 20 case 10-B1-AG4 0 -B1-AG1c -10 --20 **-**30 -20 -

1960

year

1980

2000

Figure 141. Differences for RKF: fishery total biomass.

2000

1980

10-

0 -

-10 -

-20 -

1960

RKF: fishery total biomass

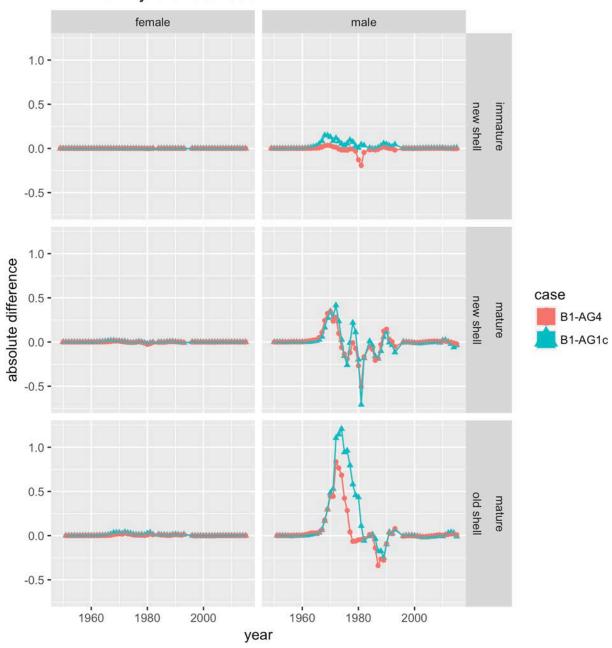


Figure 142. Differences for RKF: fishery total biomass.

Retained catch abundance

TCF: retained catch abundance

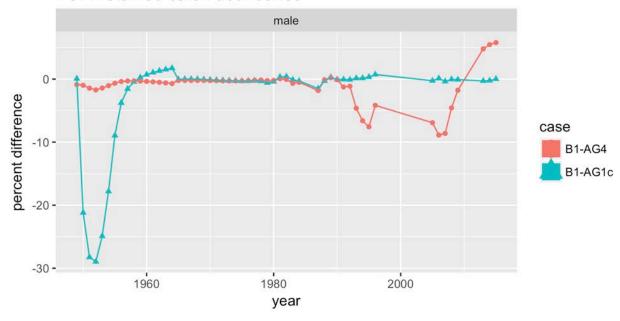


Figure 143. Differences for TCF: retained catch abundance.

TCF: retained catch abundance

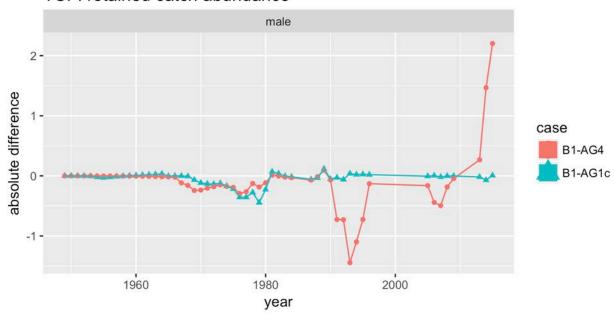


Figure 144. Differences for TCF: retained catch abundance.

TCF retained catch abundance for male all maturity all shell

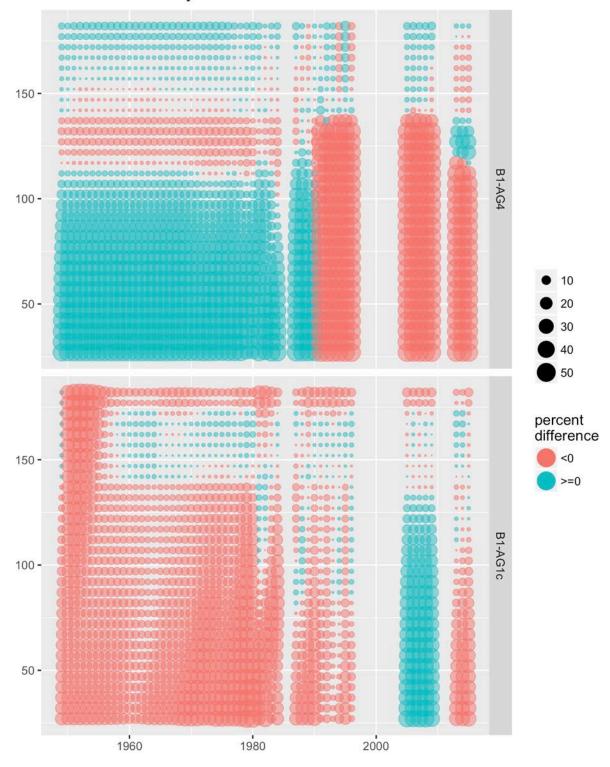


Figure 145. Differences for TCF retained catch abundance for male all maturity all shell.

TCF retained catch abundance for male all maturity all shell

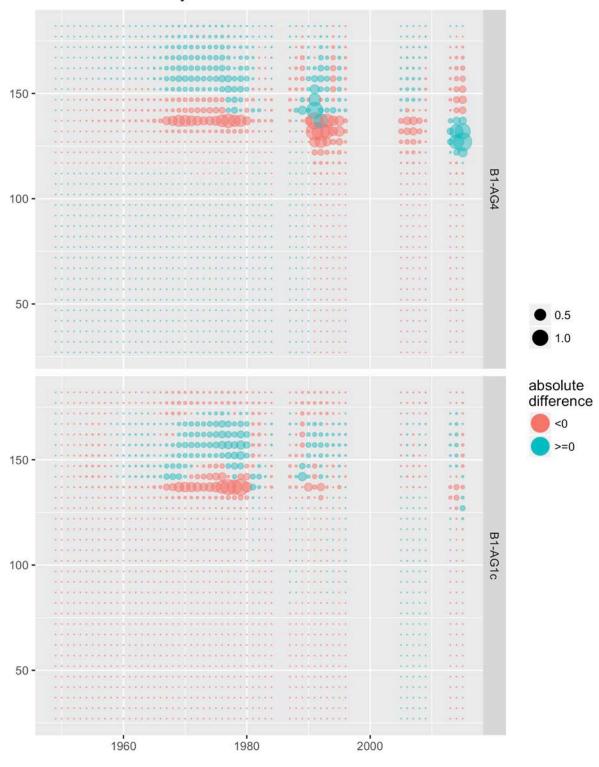


Figure 146. Differences for TCF retained catch abundance for male all maturity all shell.

Retained catch biomass

TCF: retained catch biomass

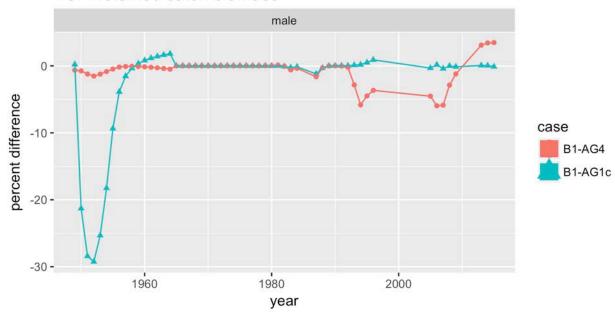


Figure 147. Differences for TCF: retained catch biomass.

TCF: retained catch biomass

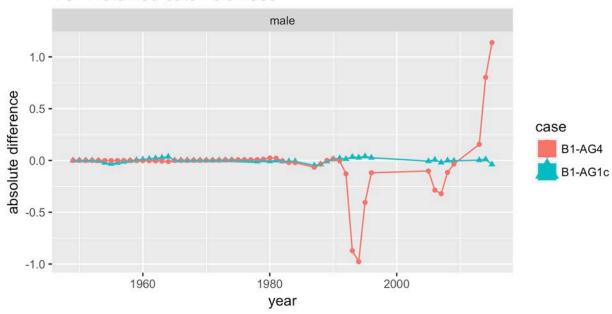


Figure 148. Differences for TCF: retained catch biomass.