### Appendix H2: Model Differences for TCAM02 Models AG1c vs AG1

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### Introduction

This document presents results from the comparison of TCSAM02 modelsAG1 and AG1c. The following plots show differences between the set of models for a variety of quantities.

### Population processes

### **Natural mortality**

# natural mortality

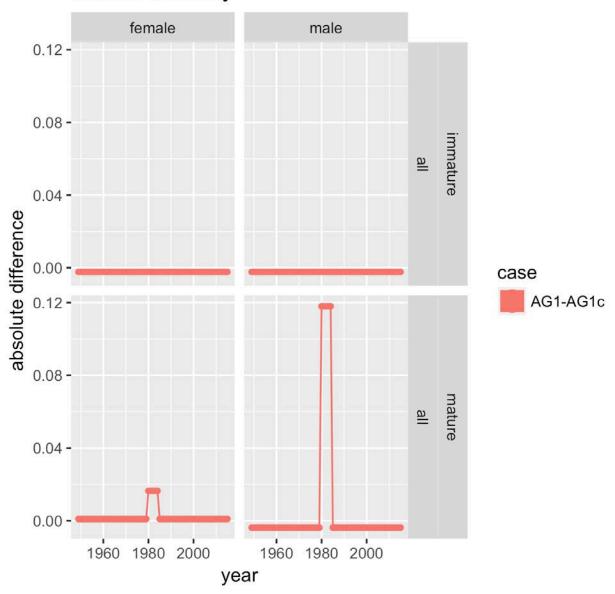


Figure 1. Differences for natural mortality.

# **Probability of terminal molt**

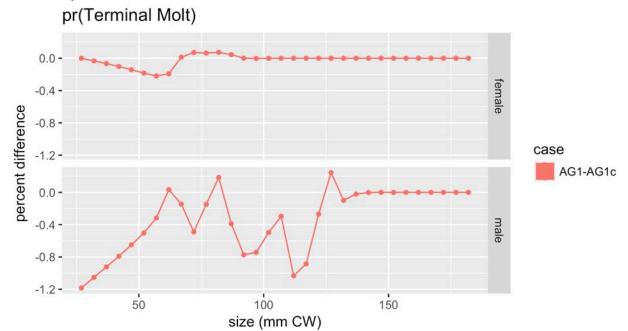


Figure 2. Differences for probability of terminal molt.

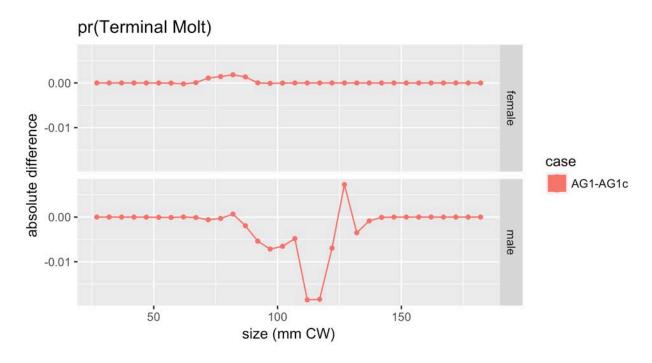


Figure 3. Differences for probability of terminal molt.

# Mean growth

# mean growth

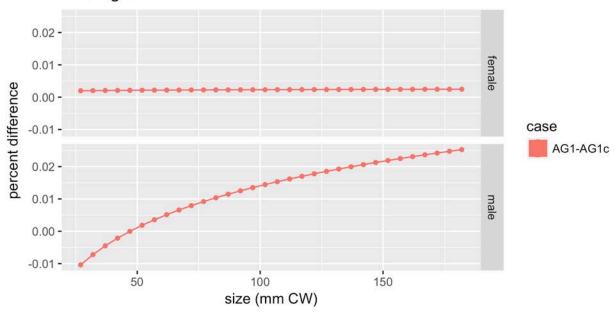


Figure 4. Differences for mean growth.

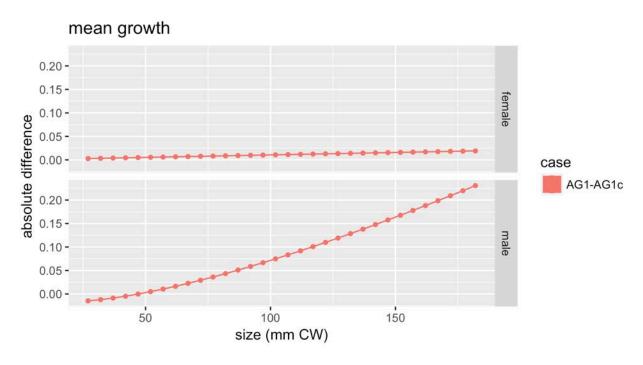


Figure 5. Differences for mean growth.

### **Growth matrices**

plotting growth matrix for female plotting growth matrix for male

# growth matrices

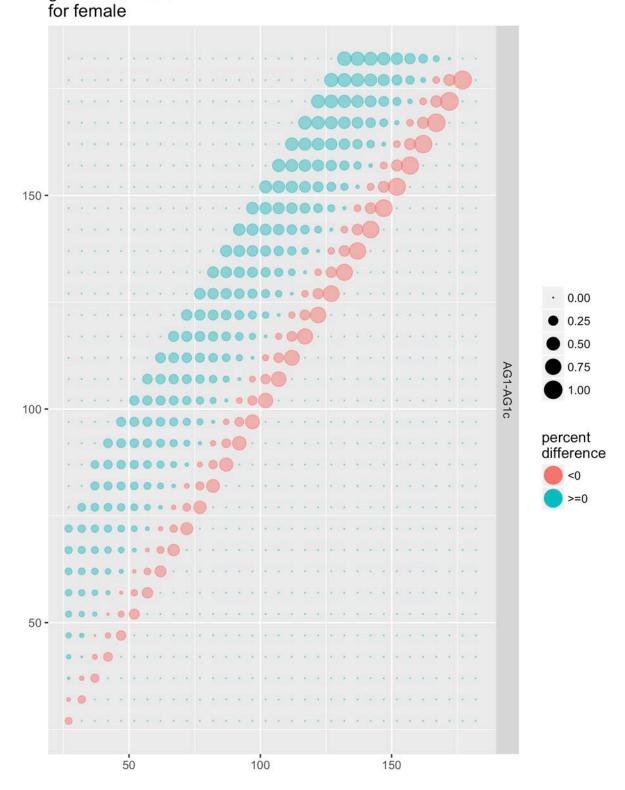


Figure 6. Growth matrix differences for female.

# growth matrices for male 150 -15 20 100 percent difference <0 50 -100 150 50

Figure 7. Growth matrix differences for male.

# growth matrices for female

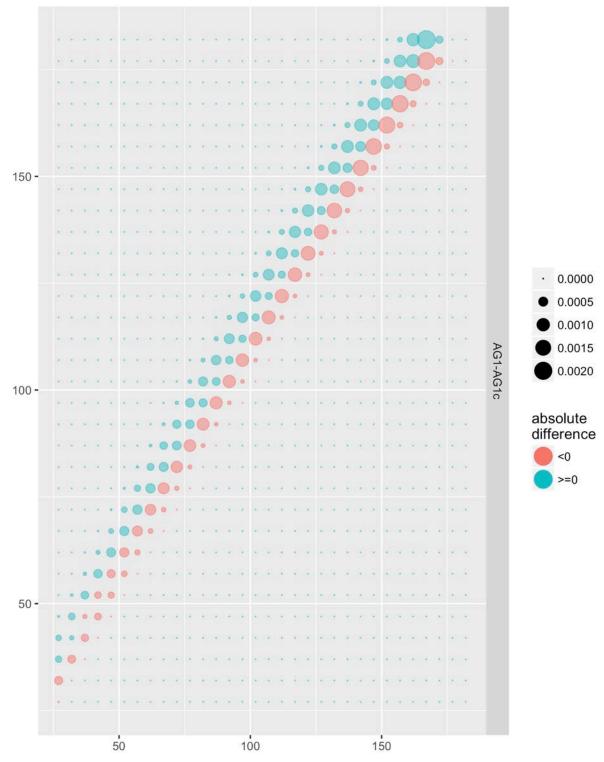


Figure 8. Growth matrix differences for female.

# growth matrices for male 150 -0.0000 0.0025 0.0050 0.0075 AG1-AG1c 0.0100 100 absolute difference <0 50 -100 150 50

Figure 9. Growth matrix differences for male.

### Size distribution for recruits

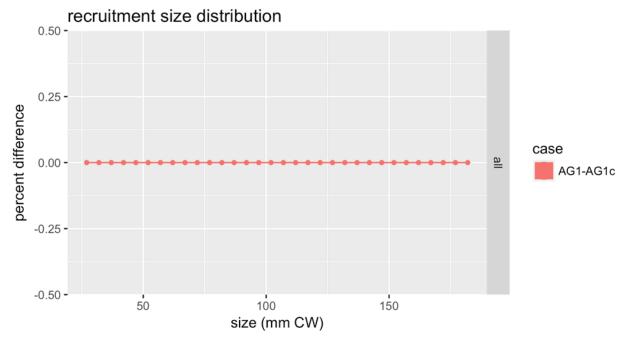


Figure 10. Differences for recruitment size distribution.

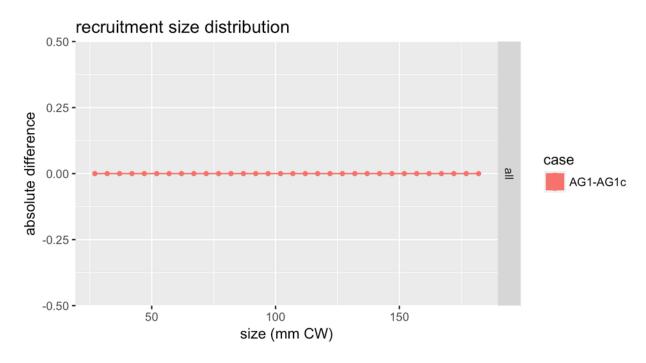


Figure 11. Differences for recruitment size distribution.

# Population results

### Recruitment

-5 **-**

# recruitment 0 -1 90 -1 new shell AG1-AG1c

2000

1980

year

Figure 12. Differences for recruitment.

1960

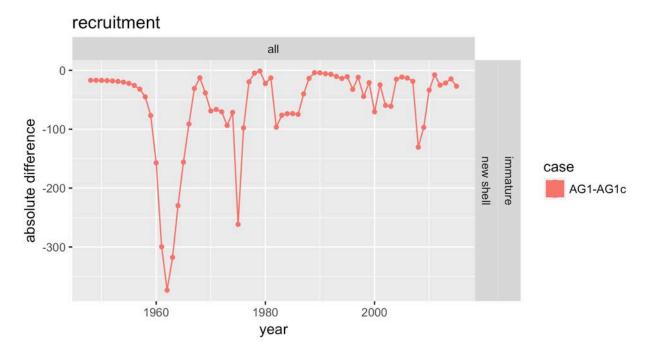


Figure 13. Differences for recruitment.

# Population abundance

# population abundance

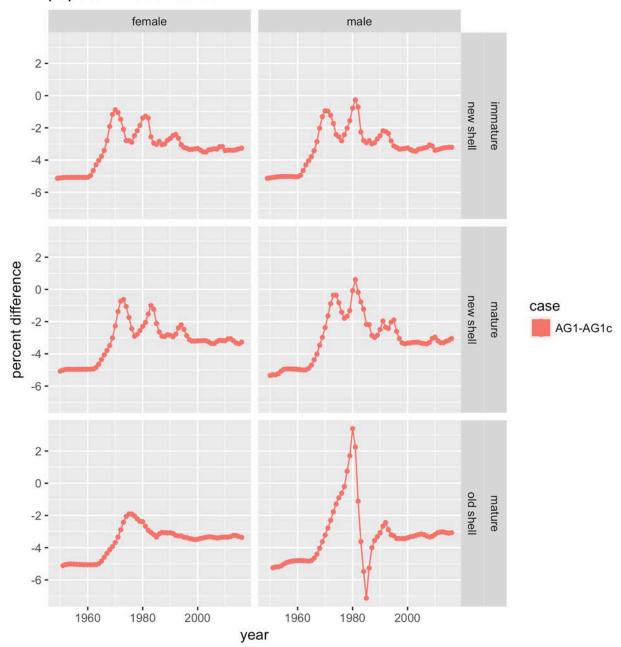


Figure 14. Differences for population abundance.

# population abundance female male 0 --100 immature new shell -200 **-**-300 **-**-400 **-**0 absolute difference -100 new shell case -200 -AG1-AG1c -300 --400 -0 -100 old shell -200 **-**-300 **-**-400 **-**1960 1980 2000 1960 1980 2000

year

Figure 15. Differences for population abundance.

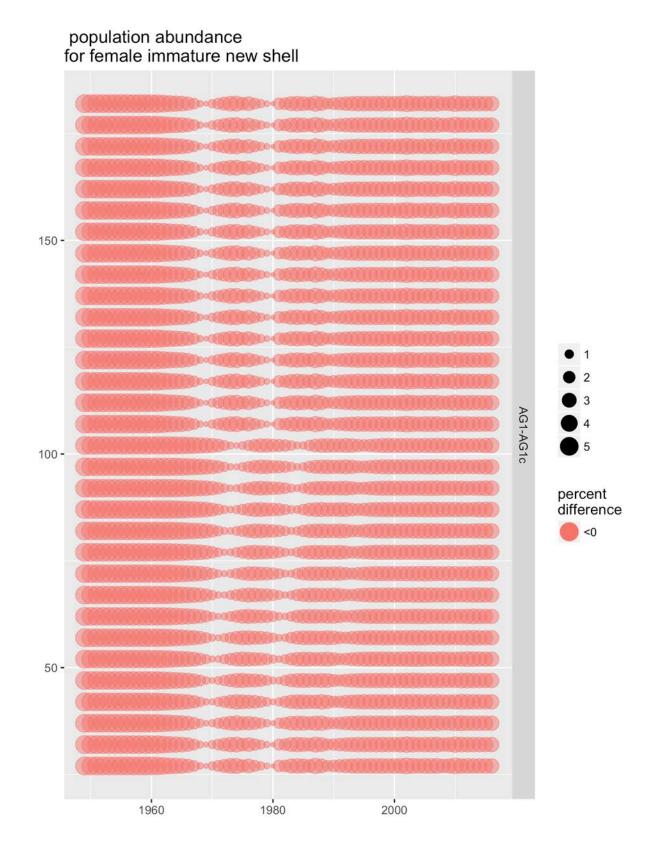


Figure 16. Differences for population abundance for female immature new shell.

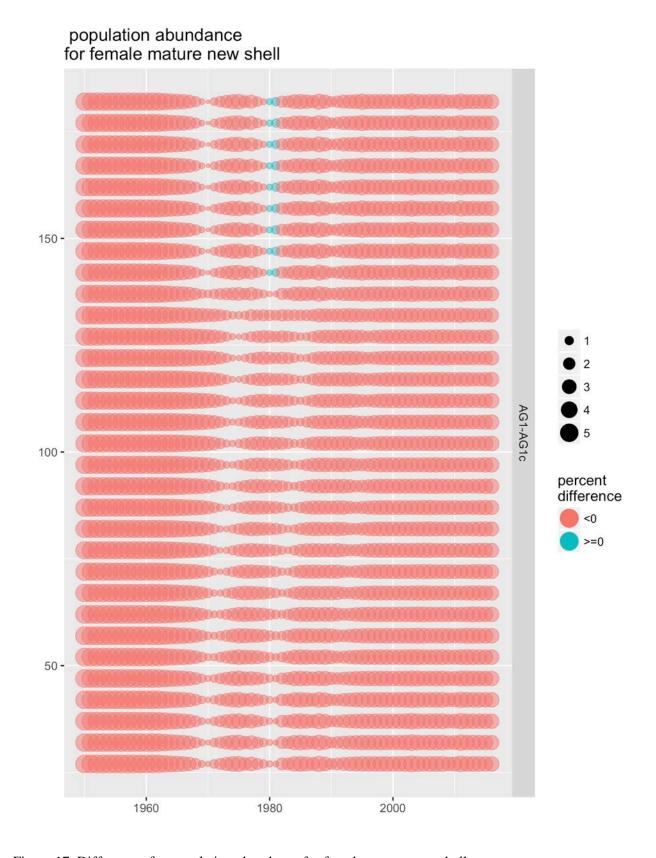


Figure 17. Differences for population abundance for female mature new shell.

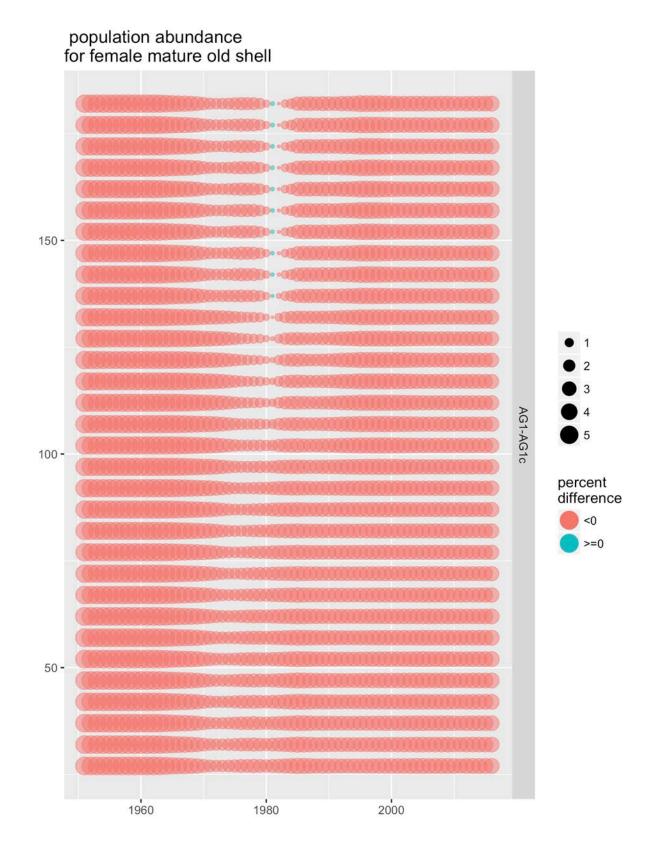


Figure 18. Differences for population abundance for female mature old shell.

# population abundance for male immature new shell 150 -2.5 5.0 7.5 AG1-AG1c 10.0 100 percent difference <0 >=0 50 -1960 2000 1980

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

# population abundance for male mature new shell

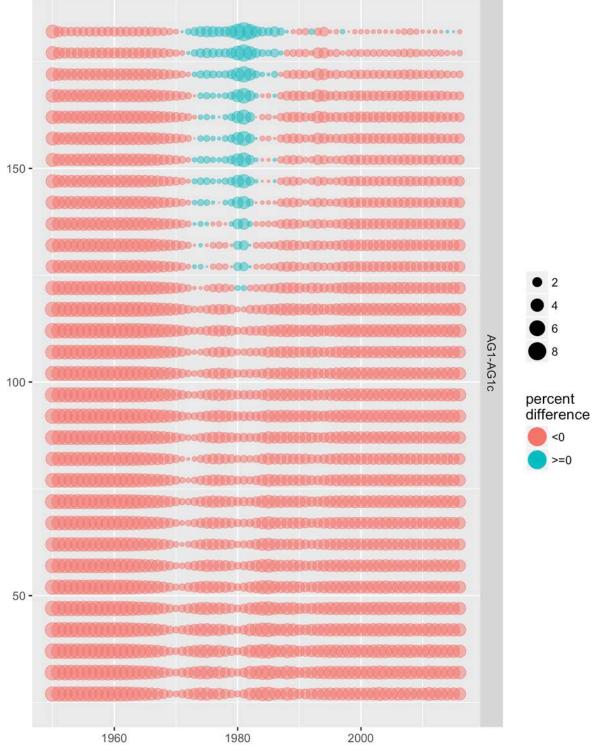


Figure 20. Differences for population abundance for male mature new shell.

# population abundance for male mature old shell

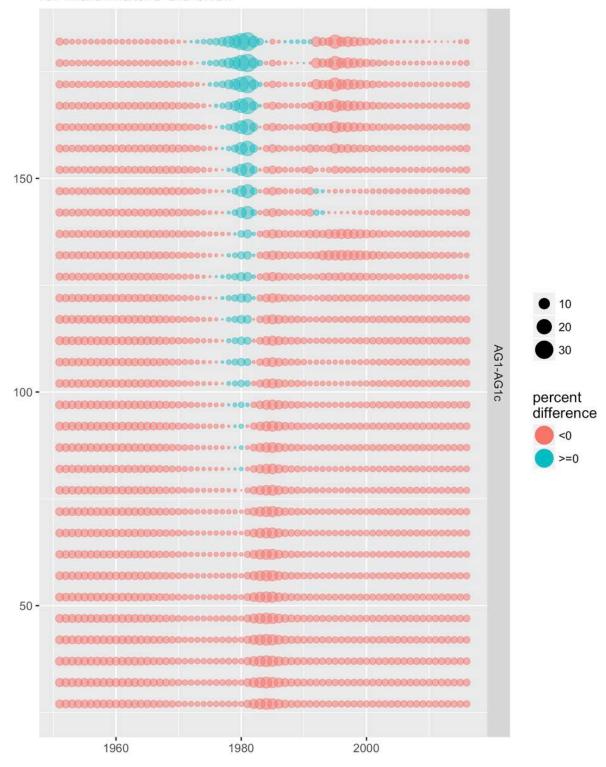


Figure 21. Differences for population abundance for male mature old shell.

# population abundance for female immature new shell

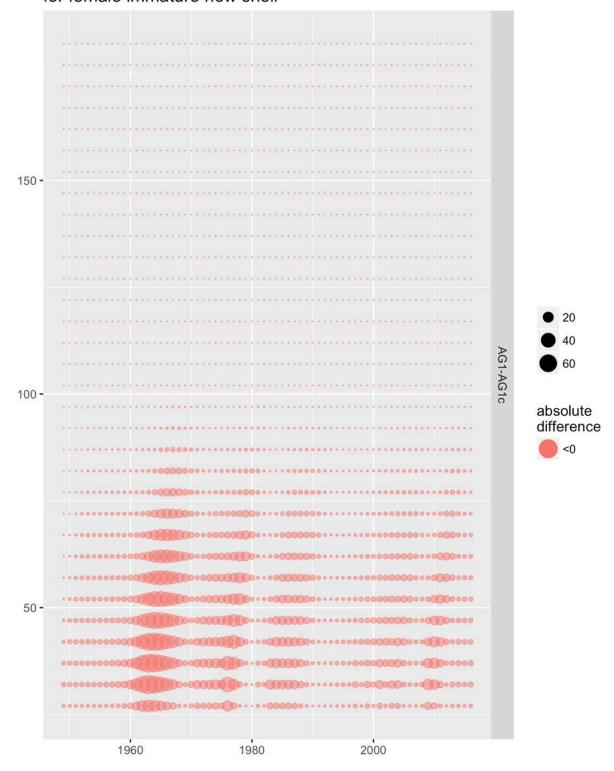


Figure 22. Differences for population abundance for female immature new shell.

# population abundance for female mature new shell

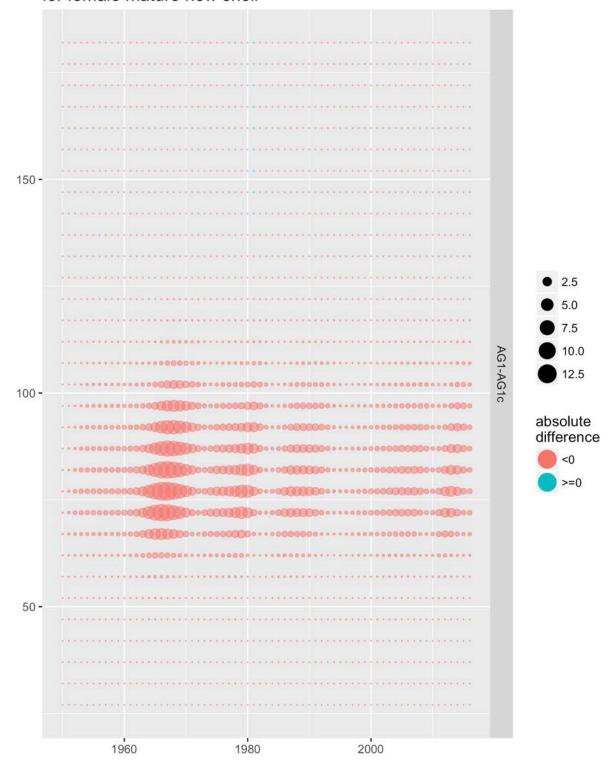


Figure 23. Differences for population abundance for female mature new shell.

# population abundance for female mature old shell

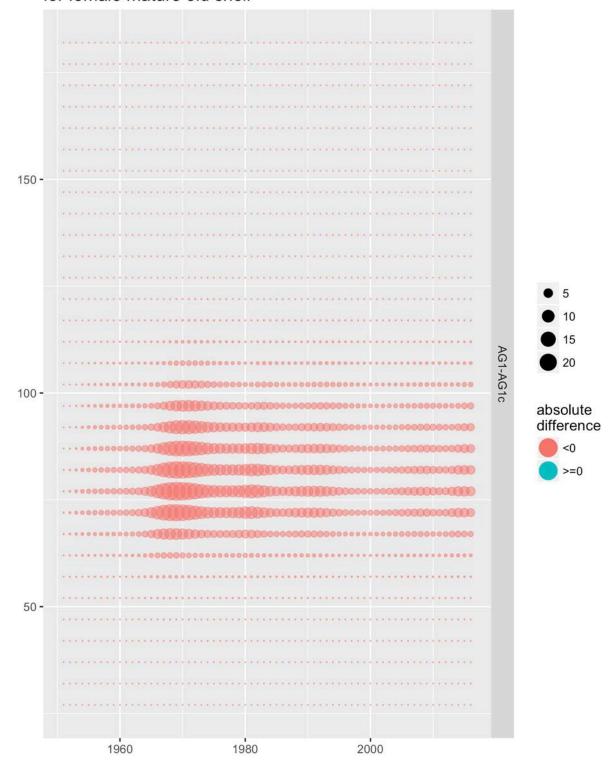


Figure 24. Differences for population abundance for female mature old shell.

# population abundance for male immature new shell

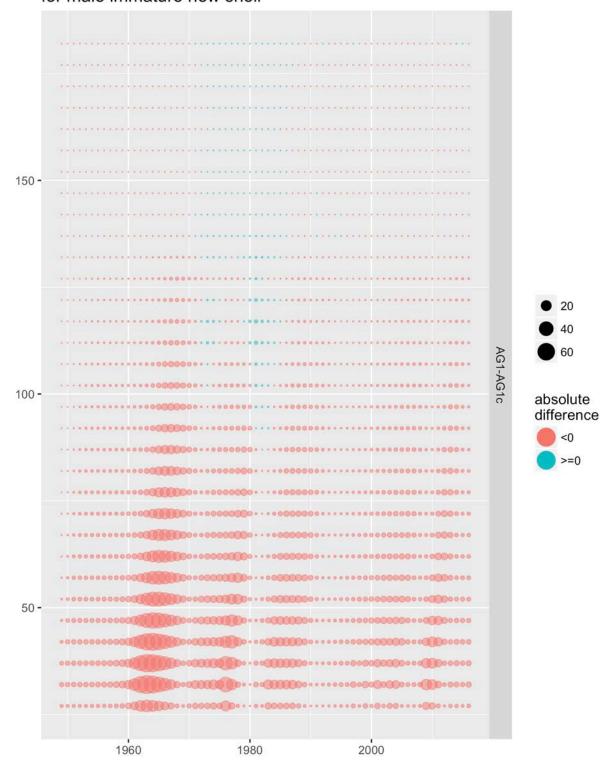


Figure 25. Differences for population abundance for male immature new shell.

# population abundance for male mature new shell

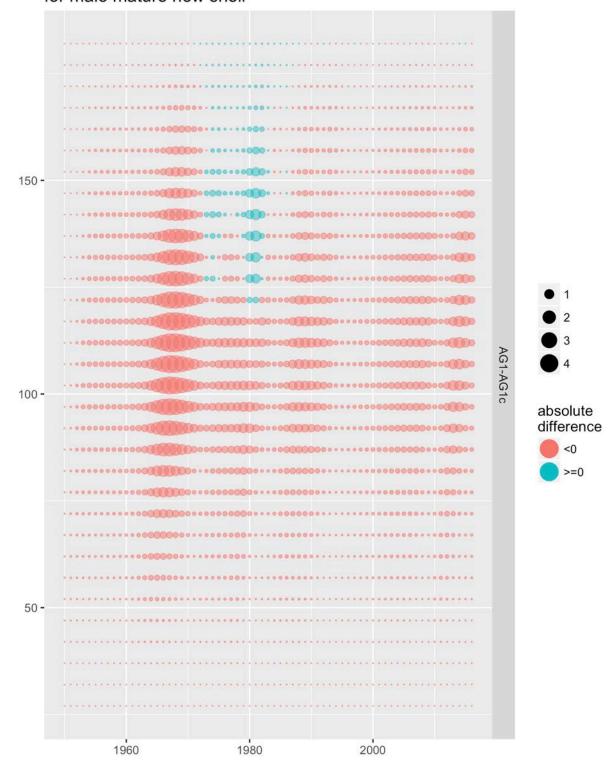


Figure 26. Differences for population abundance for male mature new shell.

# population abundance for male mature old shell

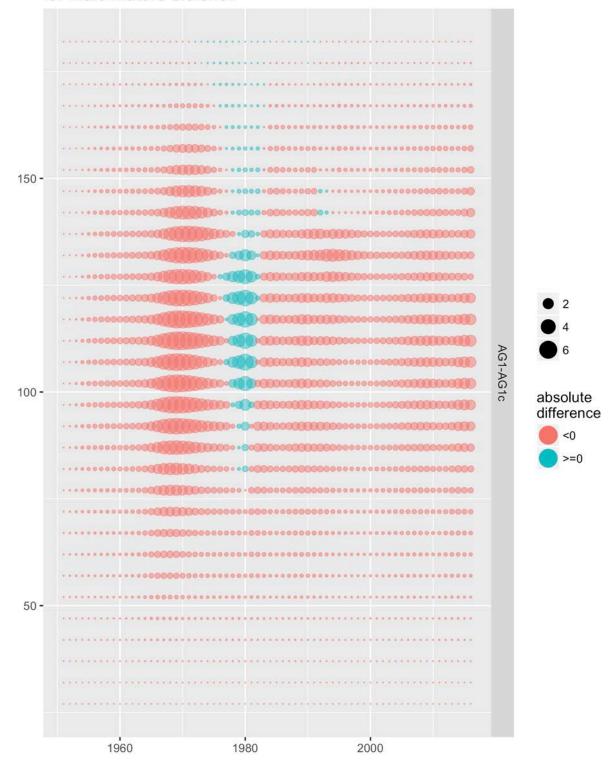


Figure 27. Differences for population abundance for male mature old shell.

# Biomass

# population biomass

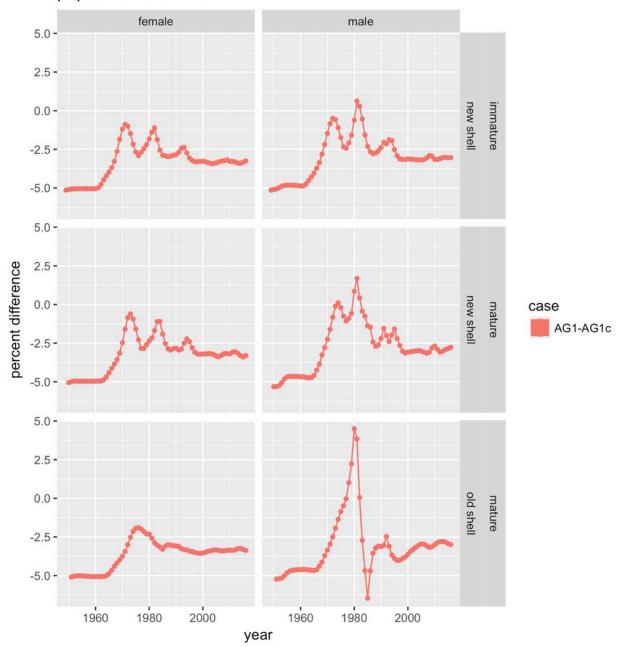


Figure 28. Differences for population biomass.

# population biomass female male 20 -10 -0 -10 --20 --30 -20 -10 absolute difference 0 new shell case -10 -AG1-AG1c -20 **-**-30 -20 -10 -0 --10 --20 **-**

1960

year

1980

2000

Figure 29. Differences for population biomass.

1980

2000

1960

-30 **-**

### Surveys

### **Survey catchability**

# NMFS trawl survey: survey catchability

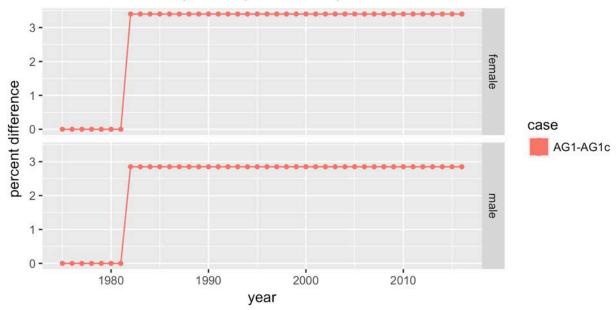


Figure 30. Differences for NMFS trawl survey: survey catchability.

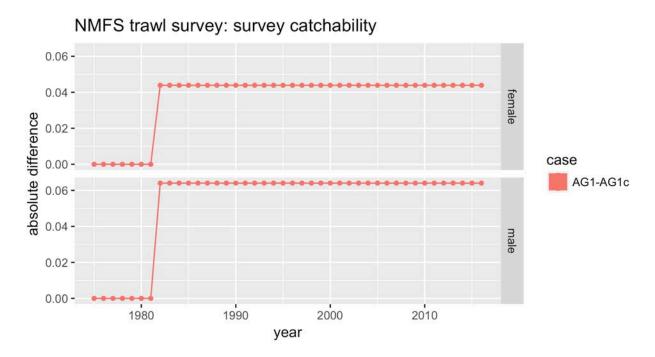


Figure 31. Differences for NMFS trawl survey: survey catchability.

### **Survey selectivity functions**

NMFS trawl survey survey selectivity for female all maturity all shell

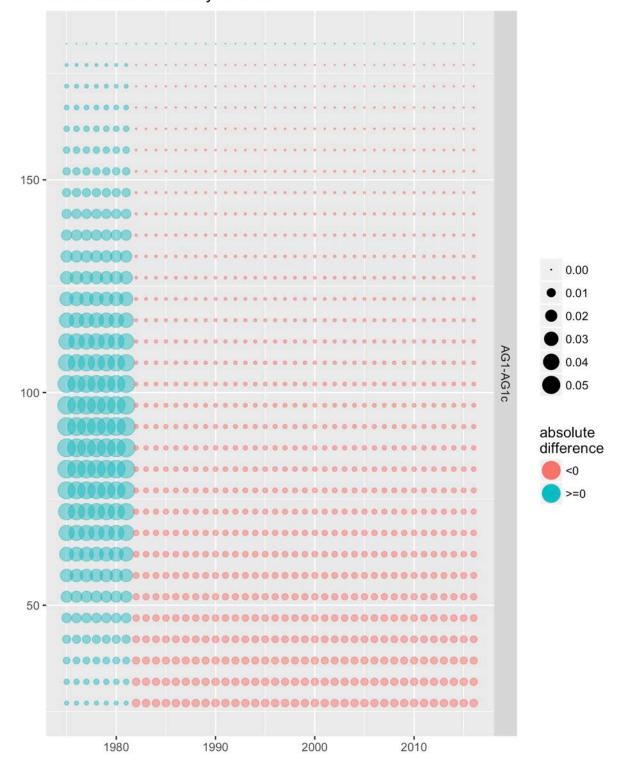


Figure 32. Differences for NMFS trawl survey survey selectivity for female all maturity all shell.

# NMFS trawl survey survey selectivity for male all maturity all shell

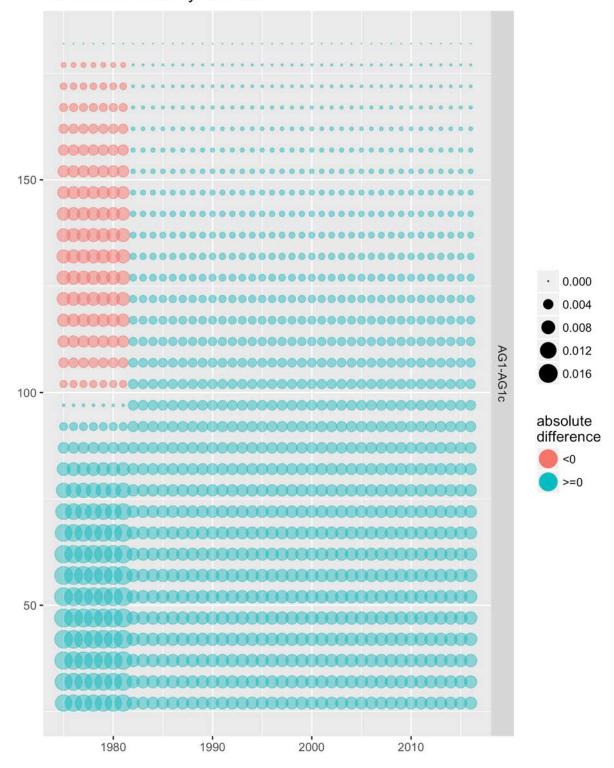


Figure 33. Differences for NMFS trawl survey survey selectivity for male all maturity all shell.

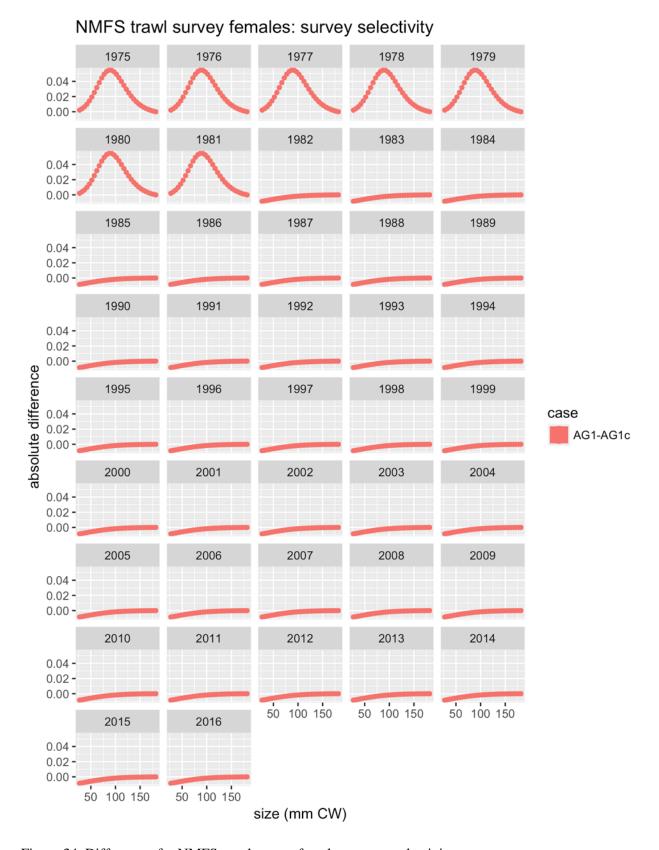


Figure 34. Differences for NMFS trawl survey females: survey selectivity.

### NMFS trawl survey males: survey selectivity 1976 1977 1978 1975 1979 0.01 -0.00 -1980 1981 1982 1983 1984 0.01 0.00 -1985 1986 1987 1988 1989 0.01 -0.00 -1990 1991 1992 1993 1994 0.01 -0.00 absolute difference 1997 1995 1996 1998 1999 case 0.01 AG1-AG1c 0.00 -2000 2001 2002 2003 2004 0.01 0.00 -2005 2007 2008 2006 2009 0.01 -0.00 -2010 2012 2013 2011 2014 0.01 -0.00 -50 100 150 50 100 150 50 100 150 2015 2016 0.01 -0.00 50 100 150 50 100 150 size (mm CW)

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

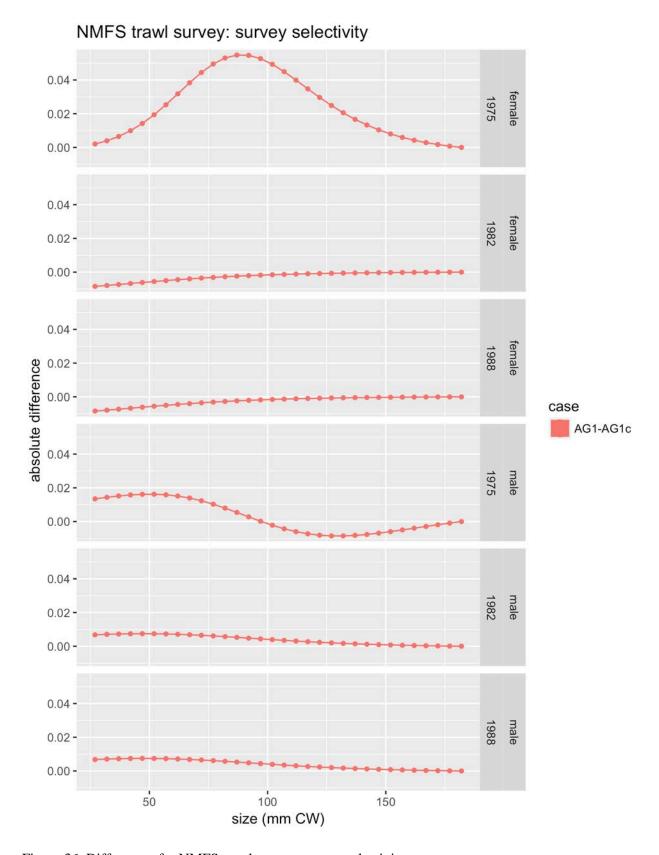


Figure 36. Differences for NMFS trawl survey: survey selectivity.

# **Survey abundance**

# NMFS trawl survey: survey abundance

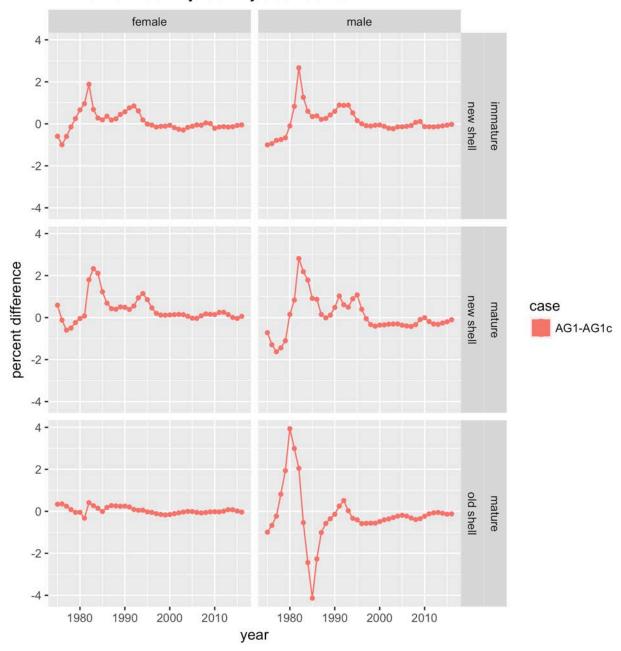


Figure 37. Differences for NMFS trawl survey: survey abundance.

# NMFS trawl survey: survey abundance

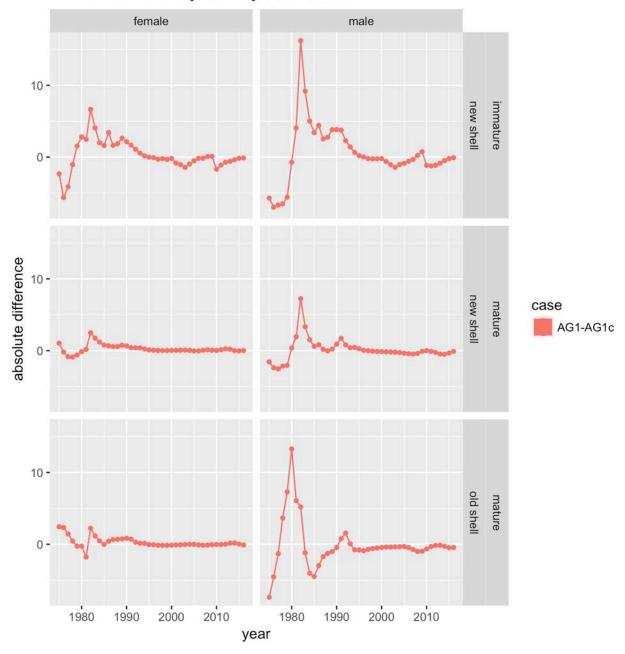


Figure 38. Differences for NMFS trawl survey: survey abundance.

# NMFS trawl survey survey abundance for female immature new shell

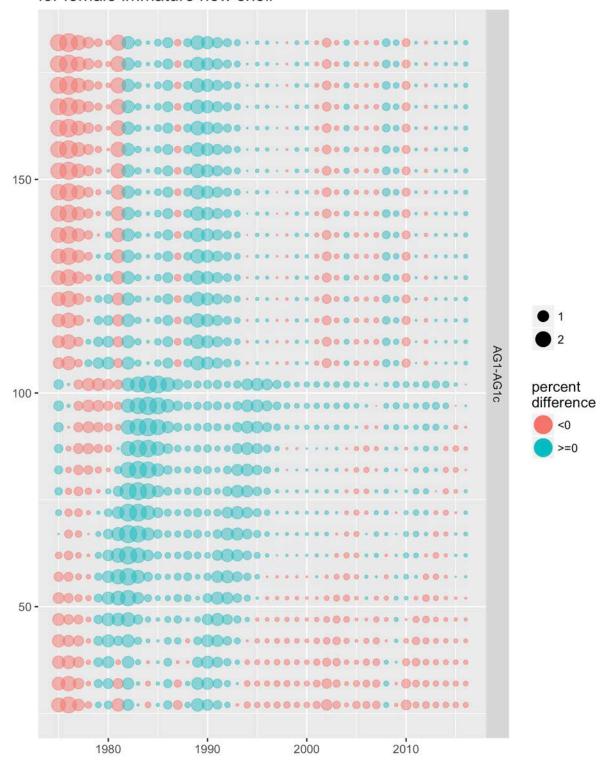


Figure 39. Differences for NMFS trawl survey survey abundance for female immature new shell.

# NMFS trawl survey survey abundance for female mature new shell

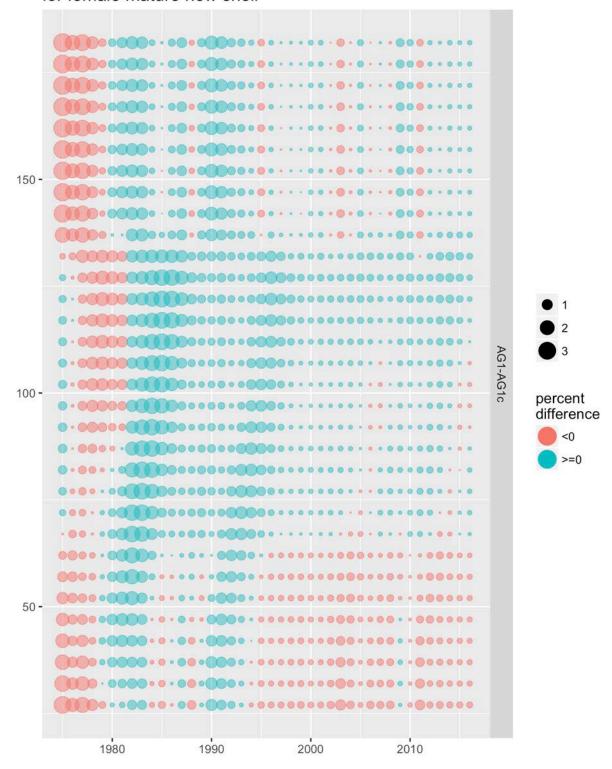


Figure 40. Differences for NMFS trawl survey survey abundance for female mature new shell.

# NMFS trawl survey survey abundance for female mature old shell

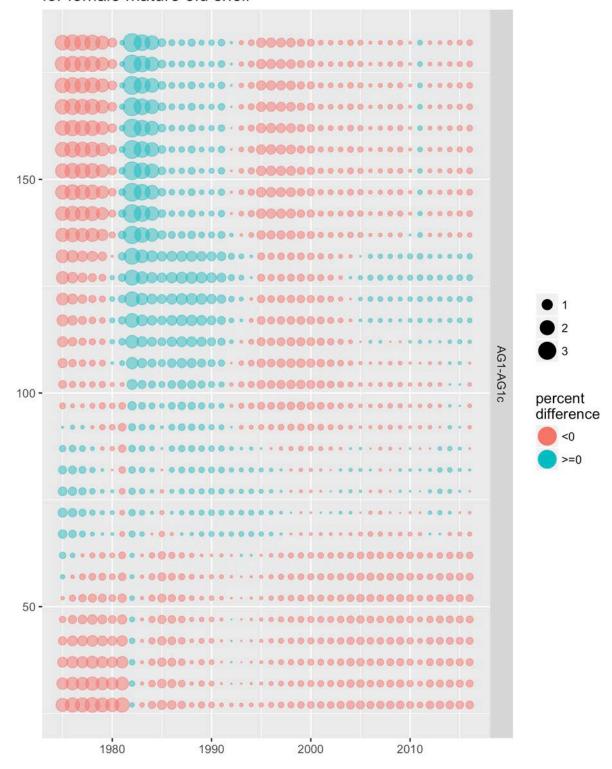


Figure 41. Differences for NMFS trawl survey survey abundance for female mature old shell.

#### NMFS trawl survey survey abundance for male immature new shell

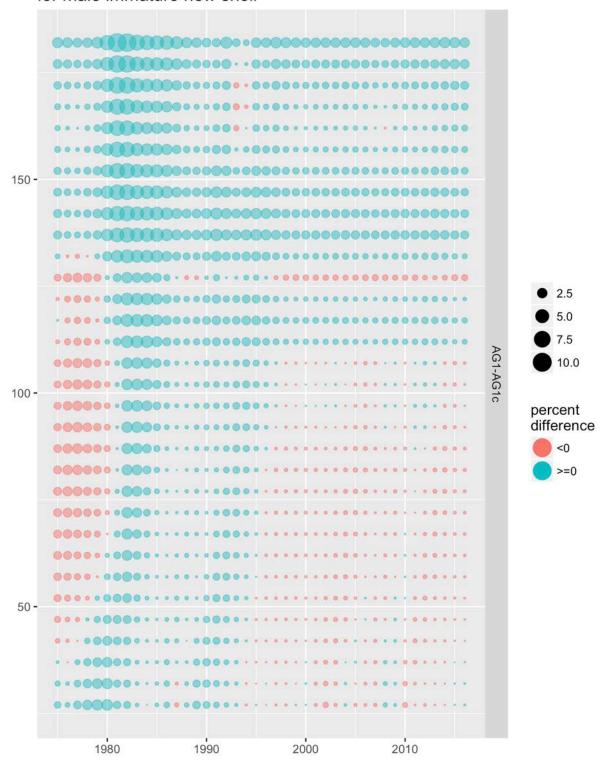


Figure 42. Differences for NMFS trawl survey survey abundance for male immature new shell.

#### NMFS trawl survey survey abundance for male mature new shell

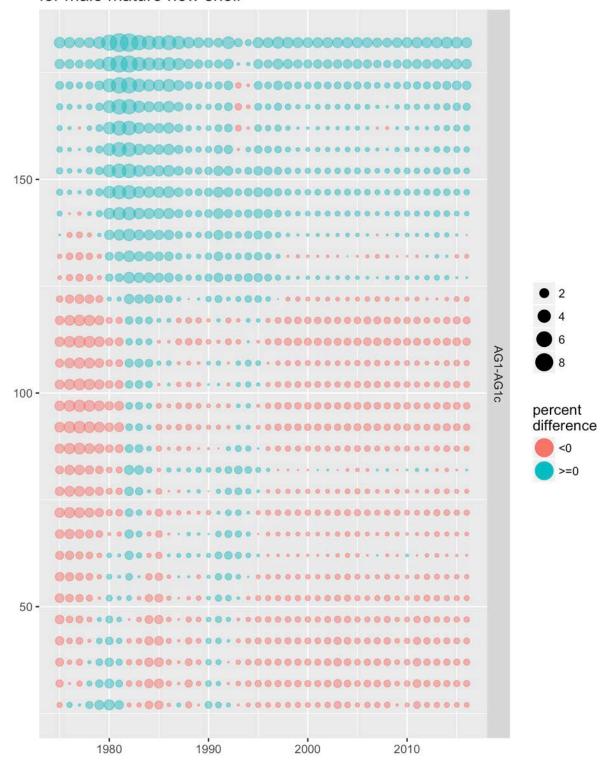


Figure 43. Differences for NMFS trawl survey survey abundance for male mature new shell.

#### NMFS trawl survey survey abundance for male mature old shell

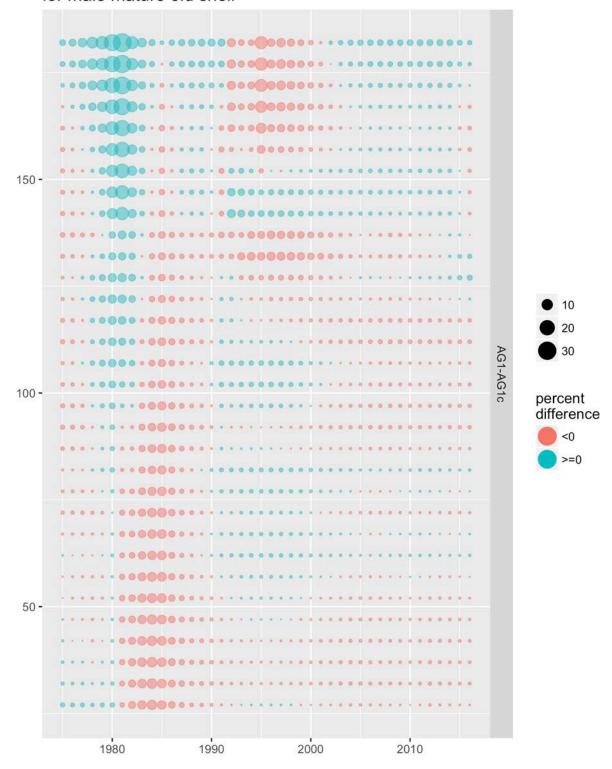


Figure 44. Differences for NMFS trawl survey survey abundance for male mature old shell.

## NMFS trawl survey survey abundance for female immature new shell

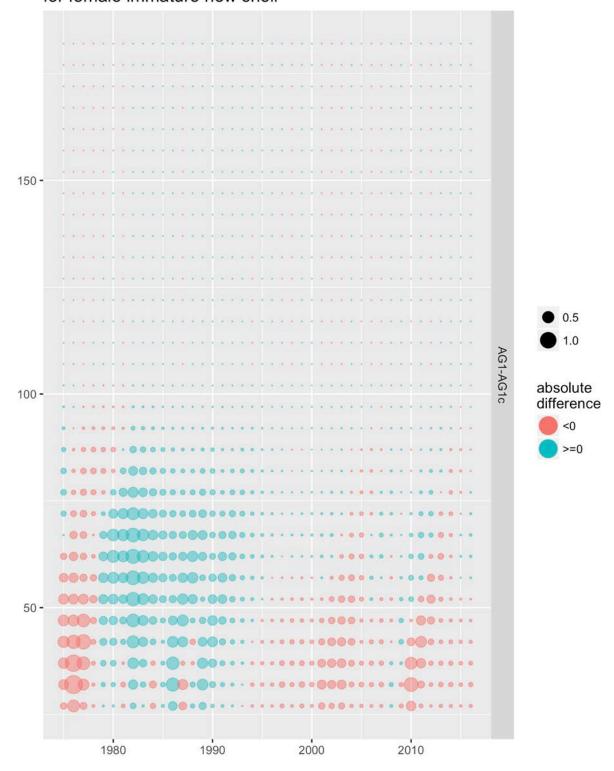


Figure 45. Differences for NMFS trawl survey survey abundance for female immature new shell.

## NMFS trawl survey survey abundance for female mature new shell

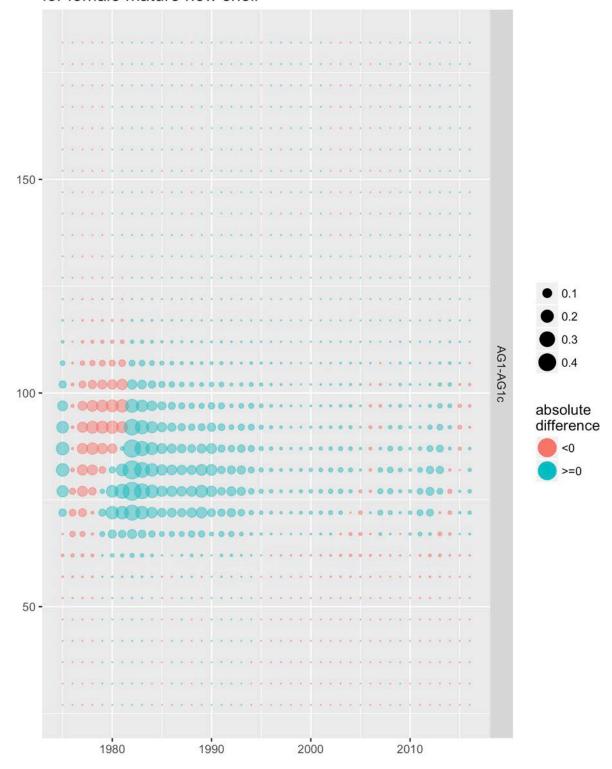


Figure 46. Differences for NMFS trawl survey survey abundance for female mature new shell.

## NMFS trawl survey survey abundance for female mature old shell

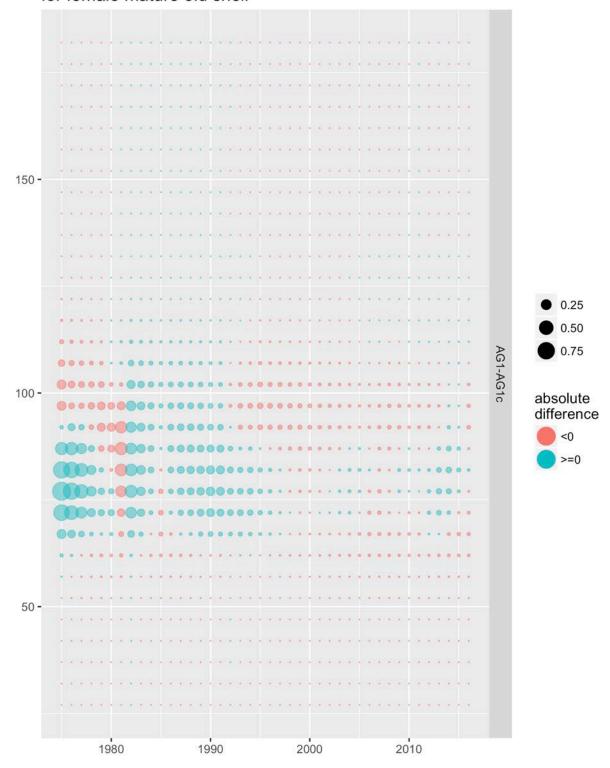


Figure 47. Differences for NMFS trawl survey survey abundance for female mature old shell.

## NMFS trawl survey survey abundance for male immature new shell

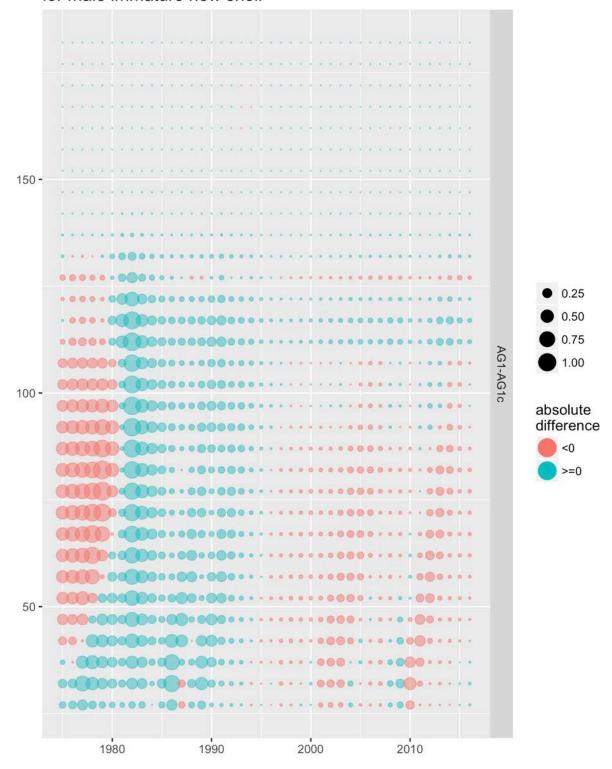


Figure 48. Differences for NMFS trawl survey survey abundance for male immature new shell.

## NMFS trawl survey survey abundance for male mature new shell

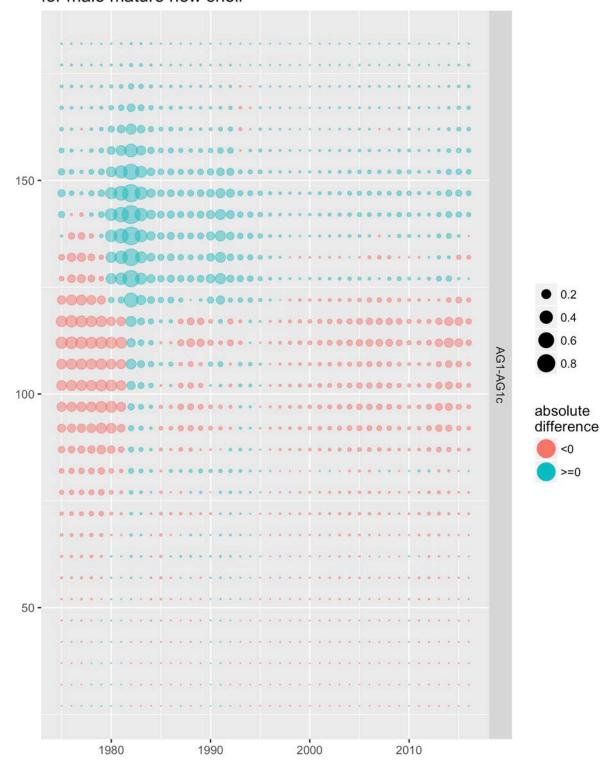


Figure 49. Differences for NMFS trawl survey survey abundance for male mature new shell.

## NMFS trawl survey survey abundance for male mature old shell

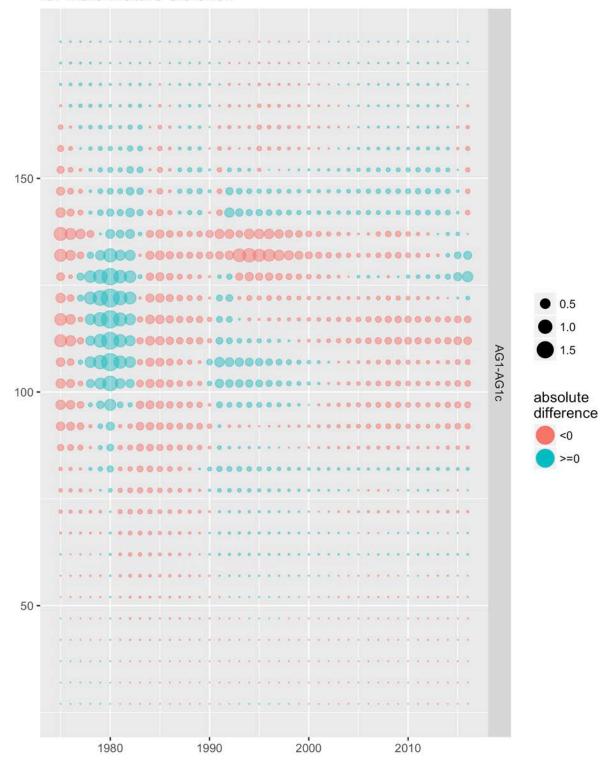


Figure 50. Differences for NMFS trawl survey survey abundance for male mature old shell.

#### **Survey biomass**

#### NMFS trawl survey: survey biomass

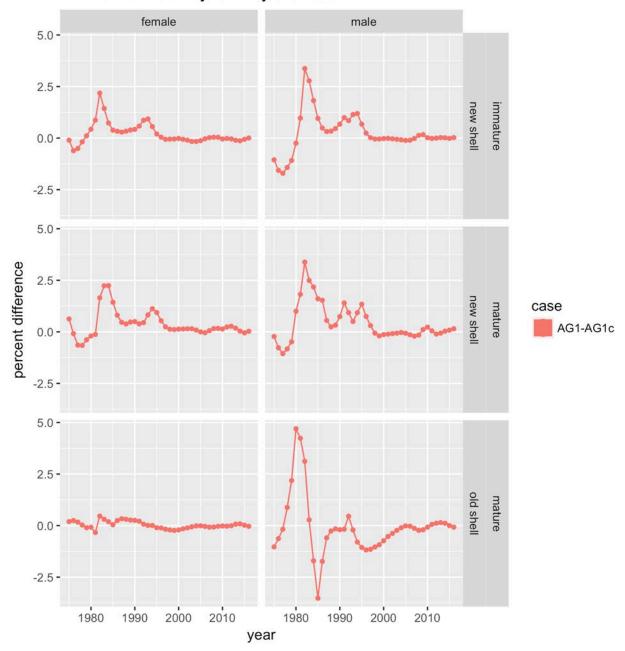


Figure 51. Differences for NMFS trawl survey: survey biomass.

#### NMFS trawl survey: survey biomass

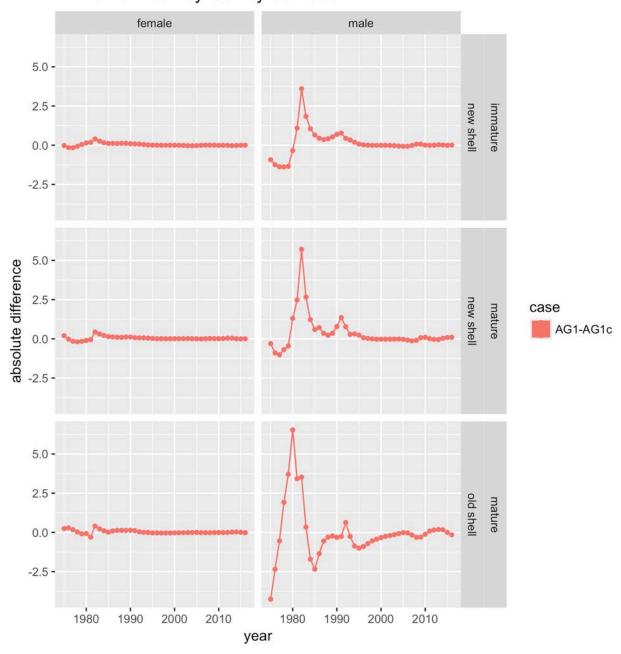
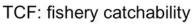


Figure 52. Differences for NMFS trawl survey: survey biomass.

#### Fisheries

#### Fishery catchability



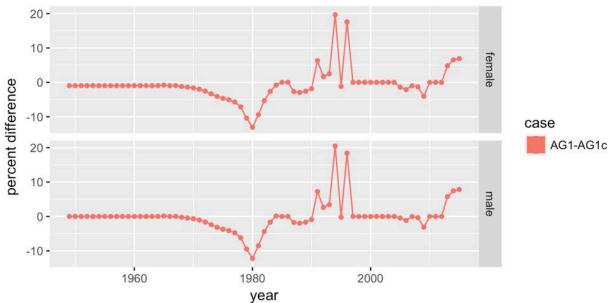


Figure 53. Differences for TCF: fishery catchability.

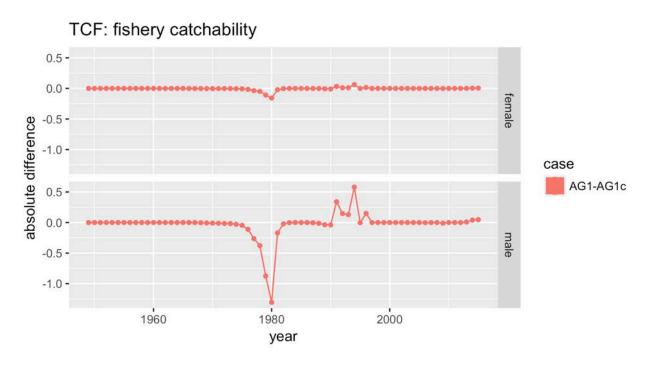


Figure 54. Differences for TCF: fishery catchability.

#### SCF: fishery catchability

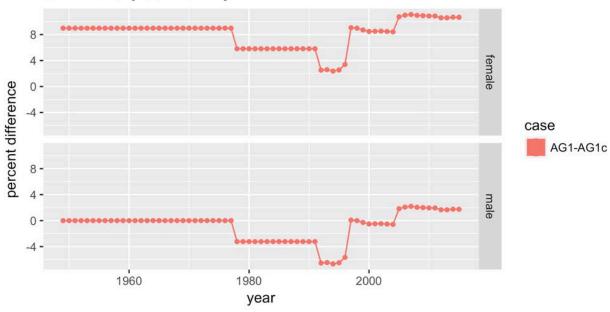


Figure 55. Differences for SCF: fishery catchability.

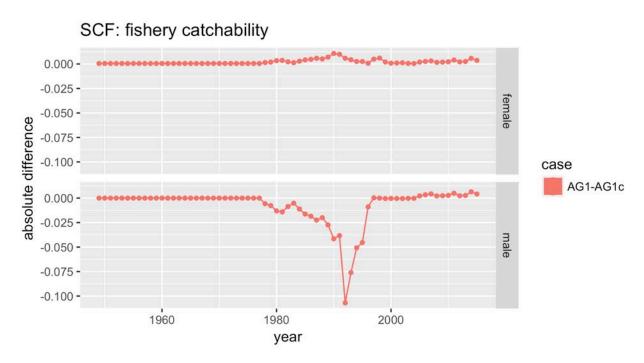


Figure 56. Differences for SCF: fishery catchability.

# GTF: fishery catchability 42242421960 1980 year Case AG1-AG1c

Figure 57. Differences for GTF: fishery catchability.

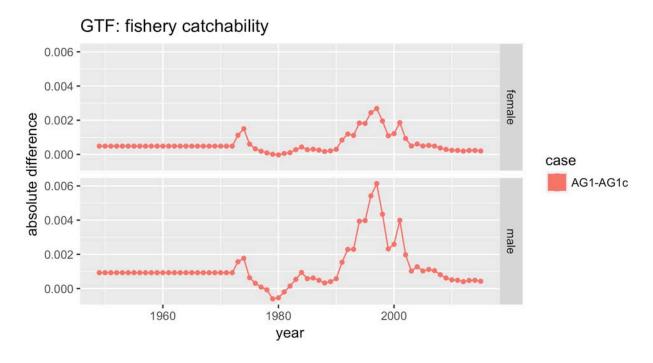


Figure 58. Differences for GTF: fishery catchability.

#### RKF: fishery catchability

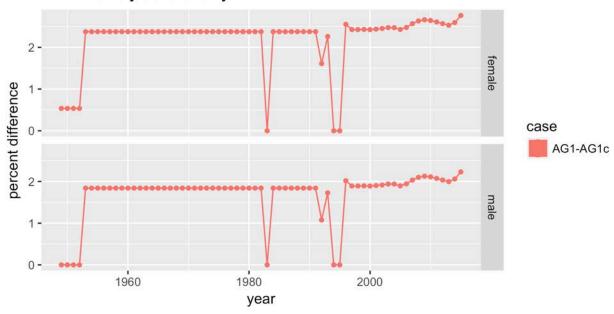


Figure 59. Differences for RKF: fishery catchability.

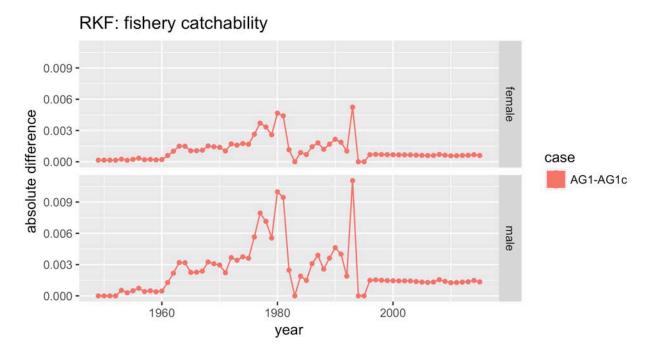


Figure 60. Differences for RKF: fishery catchability.

#### **Total selectivity functions**

## TCF fishery selectivity for female all maturity all shell

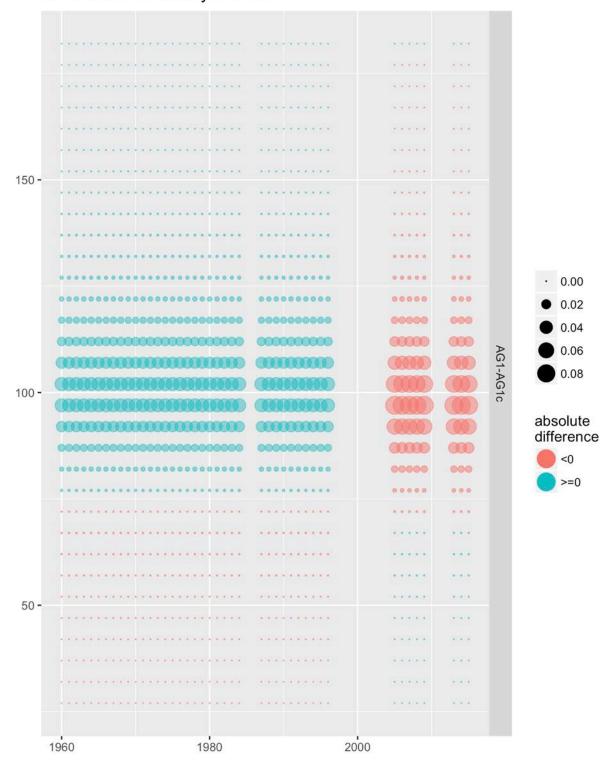


Figure 61. Differences for TCF fishery selectivity for female all maturity all shell.

## TCF fishery selectivity for male all maturity all shell

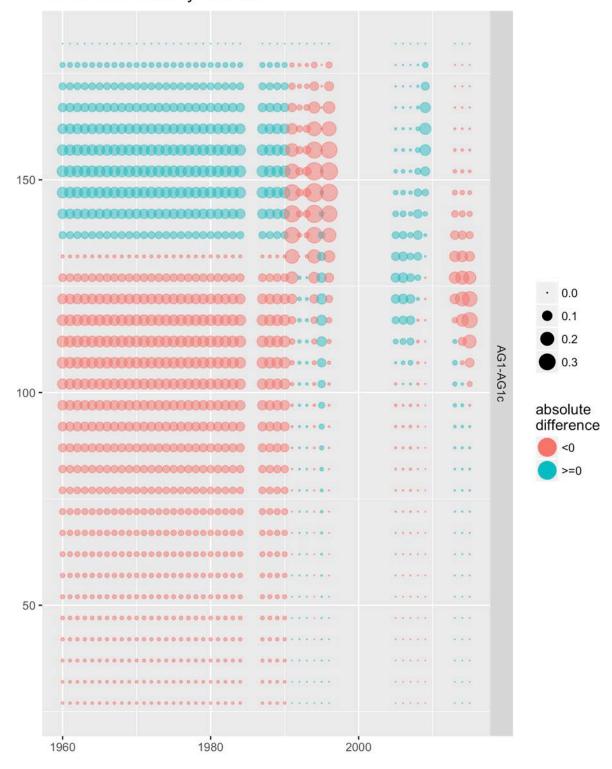


Figure 62. Differences for TCF fishery selectivity for male all maturity all shell.

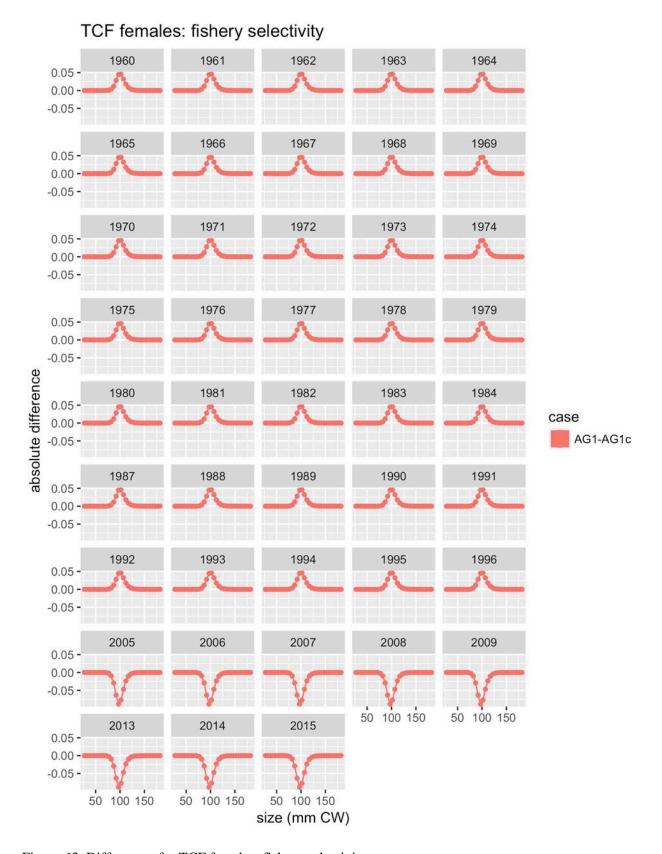


Figure 63. Differences for TCF females: fishery selectivity.

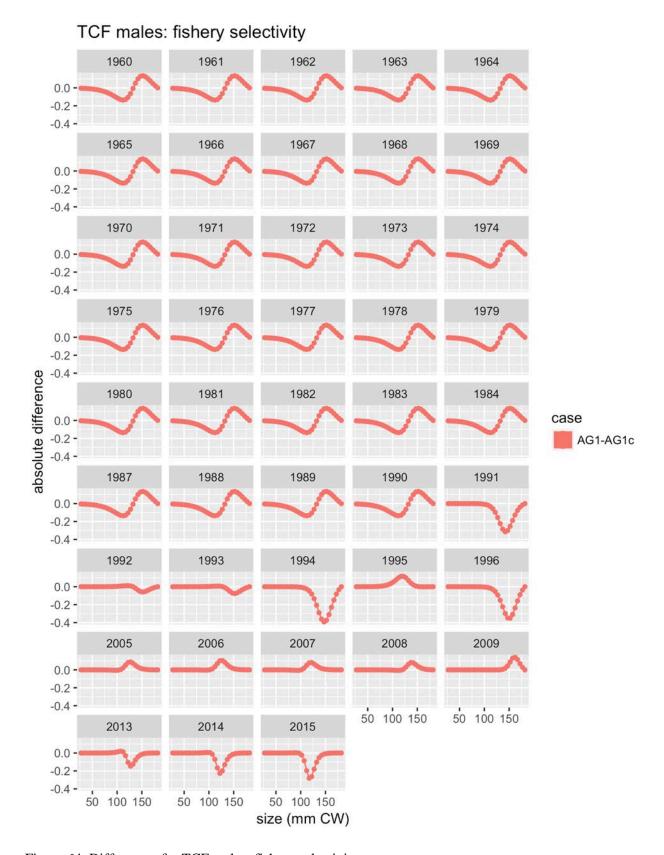


Figure 64. Differences for TCF males: fishery selectivity.

# SCF fishery selectivity for female all maturity all shell

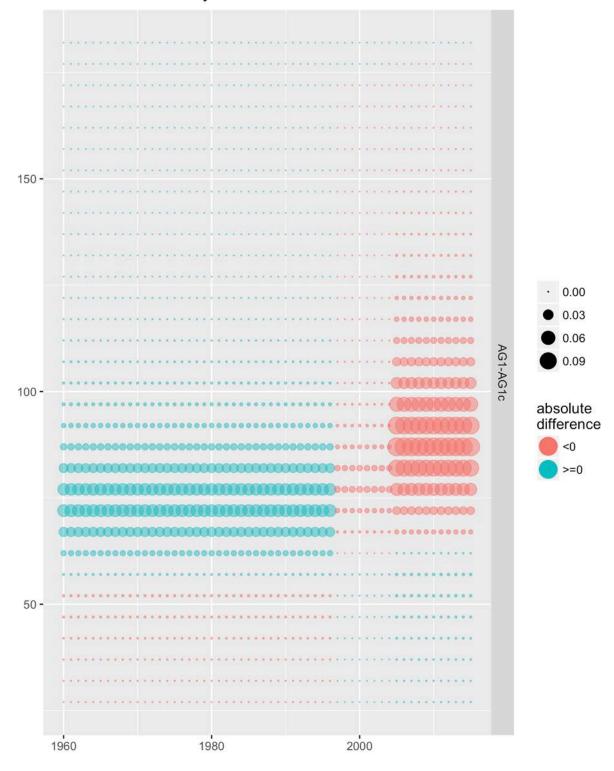


Figure 65. Differences for SCF fishery selectivity for female all maturity all shell.

# SCF fishery selectivity for male all maturity all shell

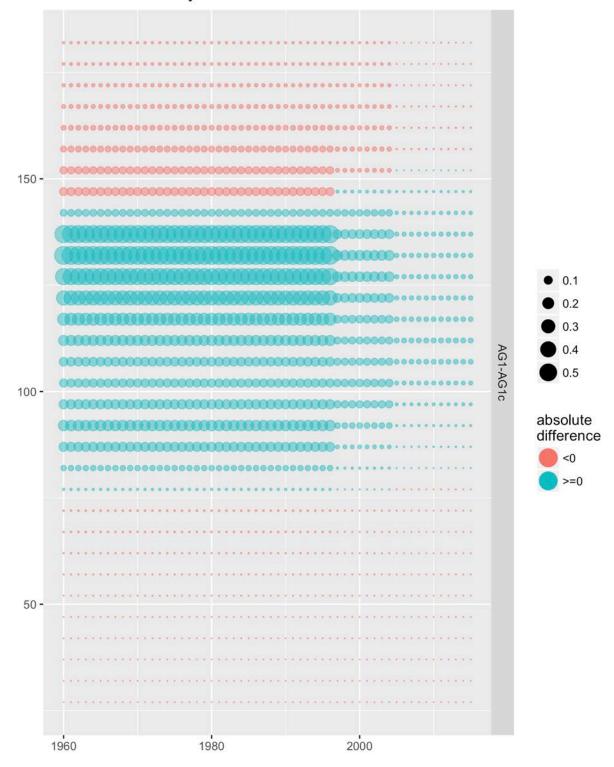


Figure 66. Differences for SCF fishery selectivity for male all maturity all shell.

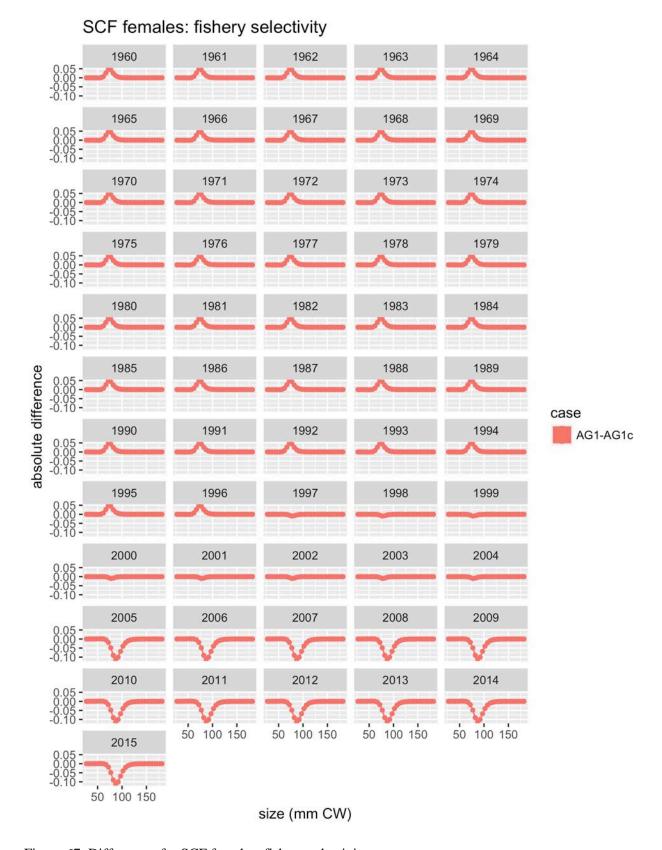


Figure 67. Differences for SCF females: fishery selectivity.

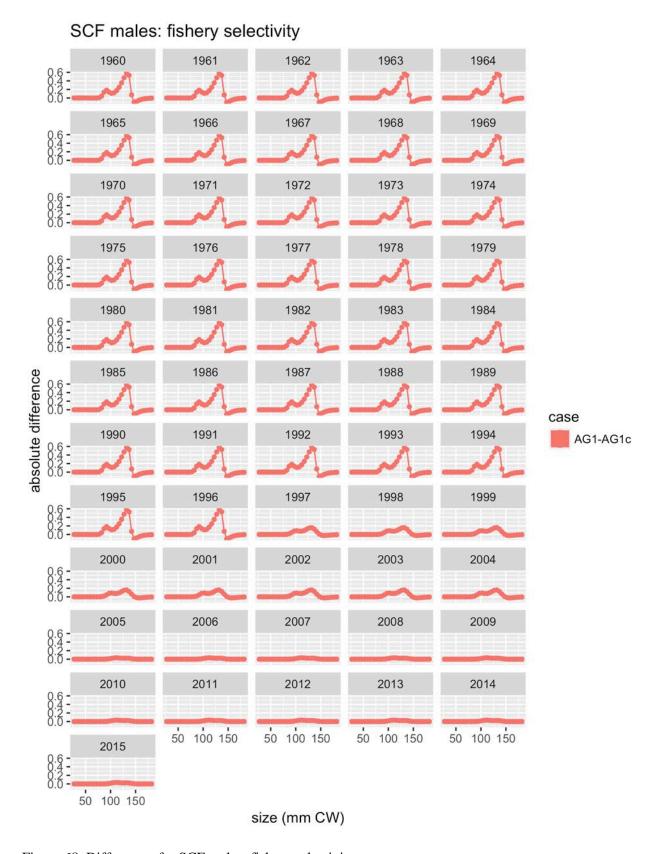


Figure 68. Differences for SCF males: fishery selectivity.

# GTF fishery selectivity for female all maturity all shell

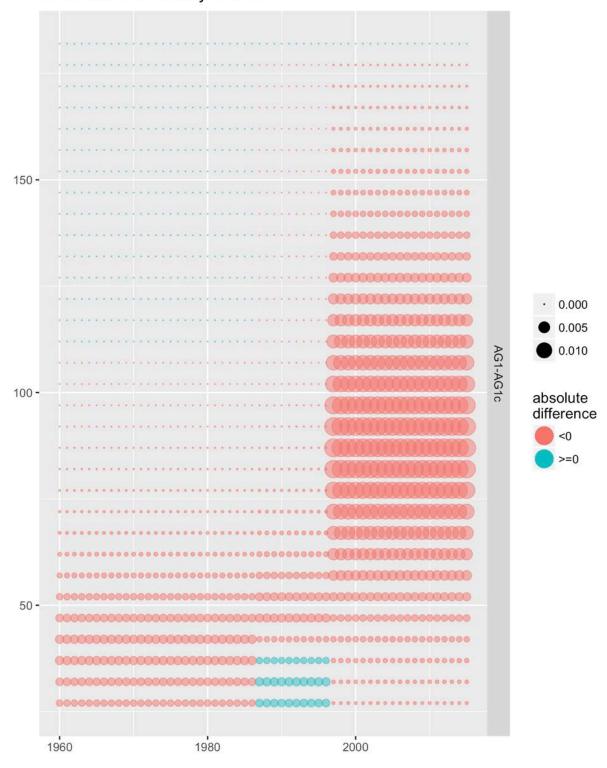


Figure 69. Differences for GTF fishery selectivity for female all maturity all shell.

# GTF fishery selectivity for male all maturity all shell

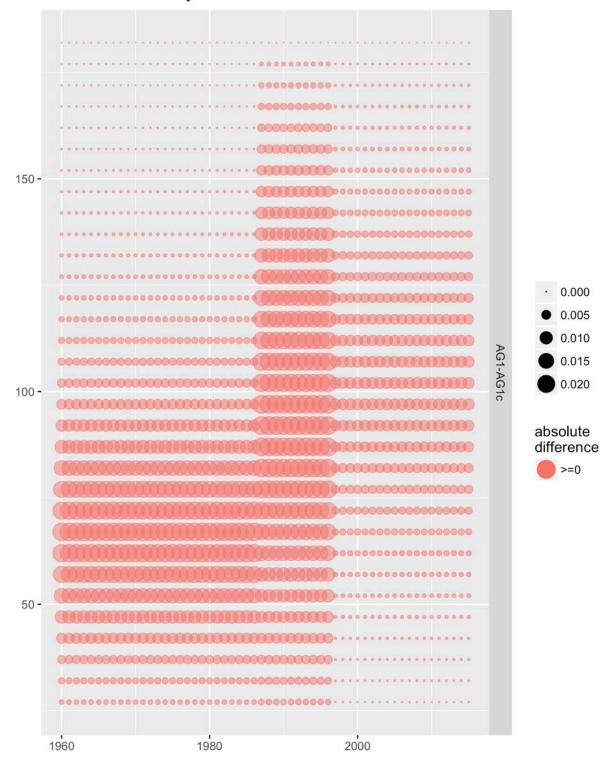


Figure 70. Differences for GTF fishery selectivity for male all maturity all shell.

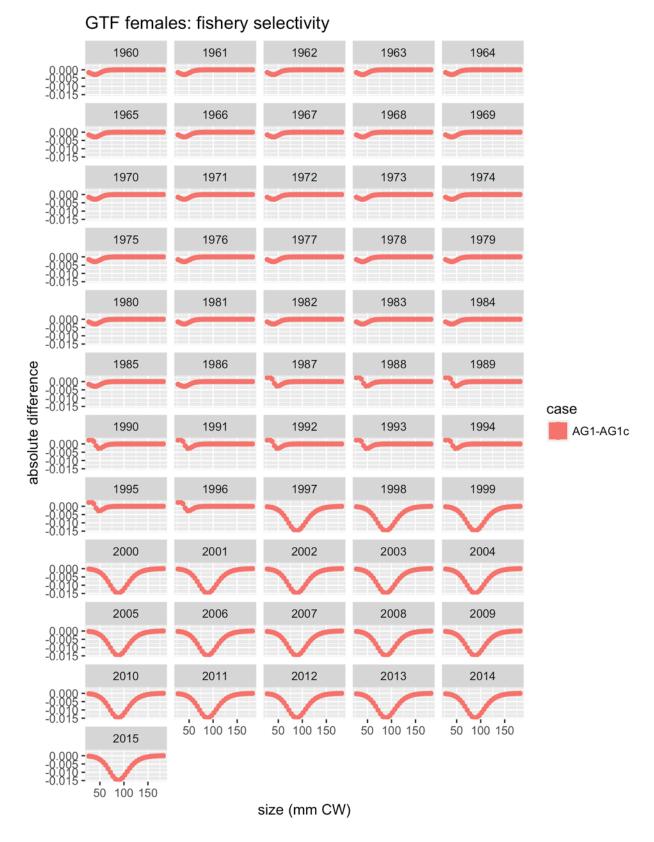


Figure 71. Differences for GTF females: fishery selectivity.

#### GTF males: fishery selectivity absolute difference case AG1-AG1c 50 100 150 50 100 150 50 100 150 50 100 150 50 100 150 size (mm CW)

Figure 72. Differences for GTF males: fishery selectivity.

# RKF fishery selectivity for female all maturity all shell

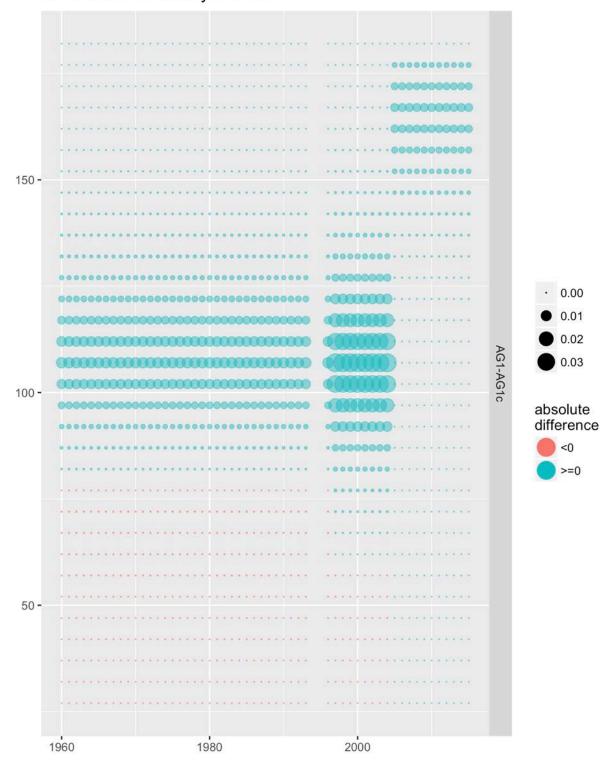


Figure 73. Differences for RKF fishery selectivity for female all maturity all shell.

# RKF fishery selectivity for male all maturity all shell

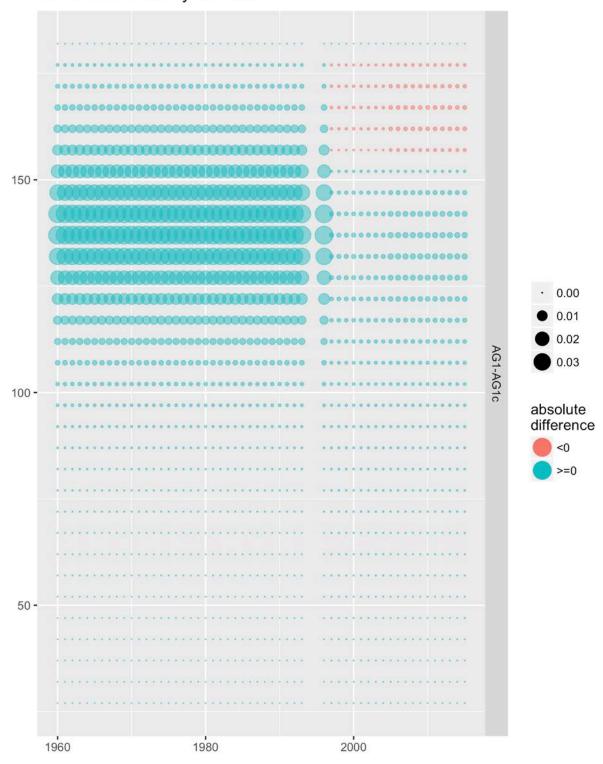


Figure 74. Differences for RKF fishery selectivity for male all maturity all shell.

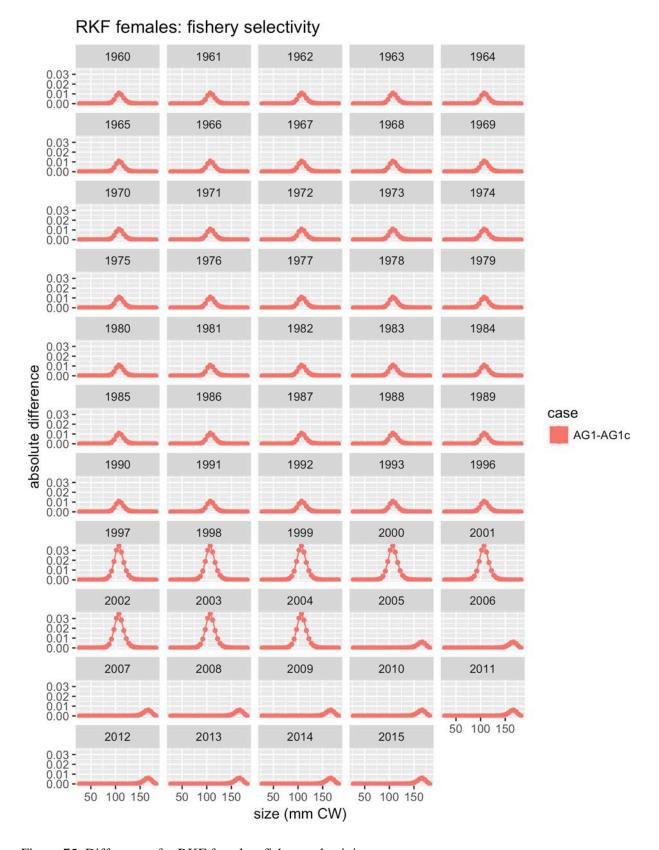


Figure 75. Differences for RKF females: fishery selectivity.

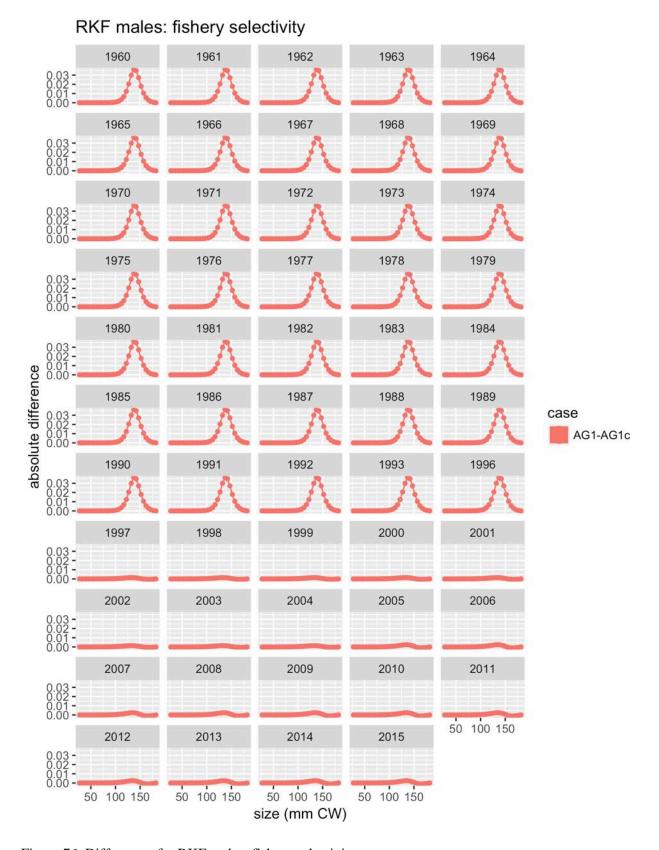


Figure 76. Differences for RKF males: fishery selectivity.

#### **Retention functions**

## TCF fishery retention for male all maturity all shell

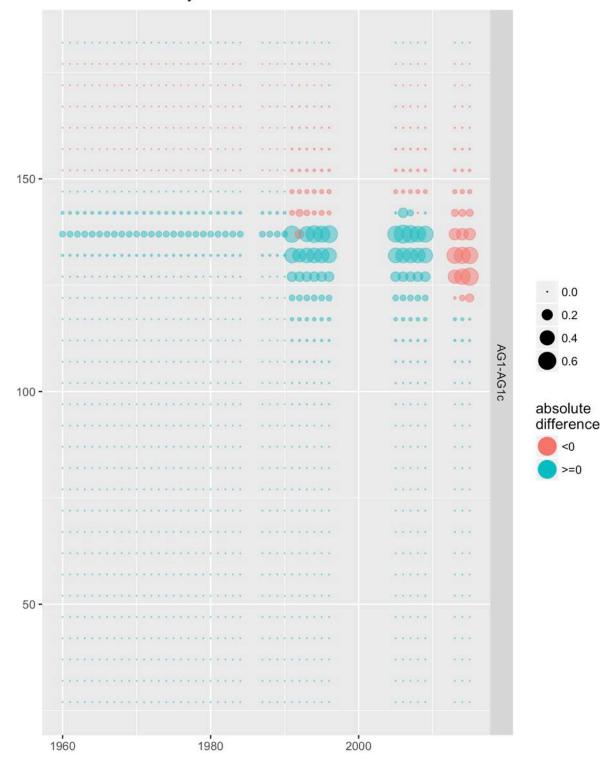


Figure 77. Differences for TCF fishery retention for male all maturity all shell.

#### TCF males: fishery retention 1960 1961 1962 1963 1964 0.4 -0.0 --0.4 -1965 1966 1967 1968 1969 0.4 -0.0 --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 1982 1980 1981 1983 1984 0.4 case 0.0 AG1-AG1c -0.4 -1989 1990 1987 1988 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 2015 2013 2014 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

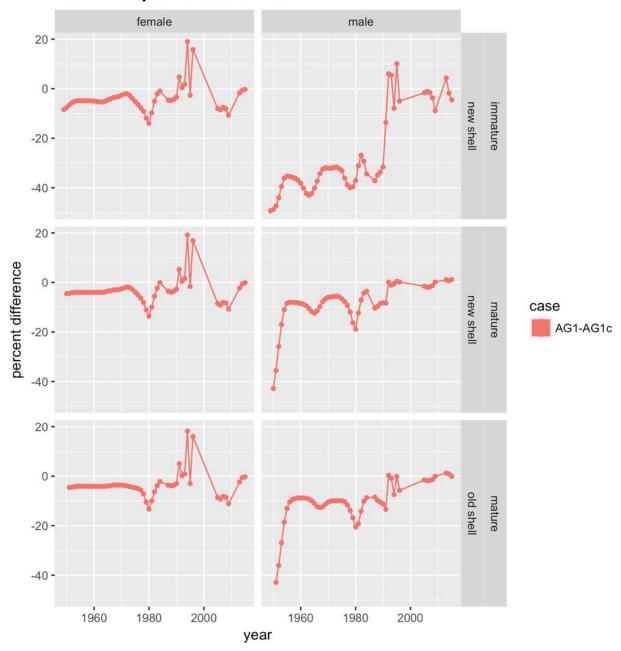


Figure 79. Differences for TCF: fishery catch abundance.

#### TCF: fishery catch abundance

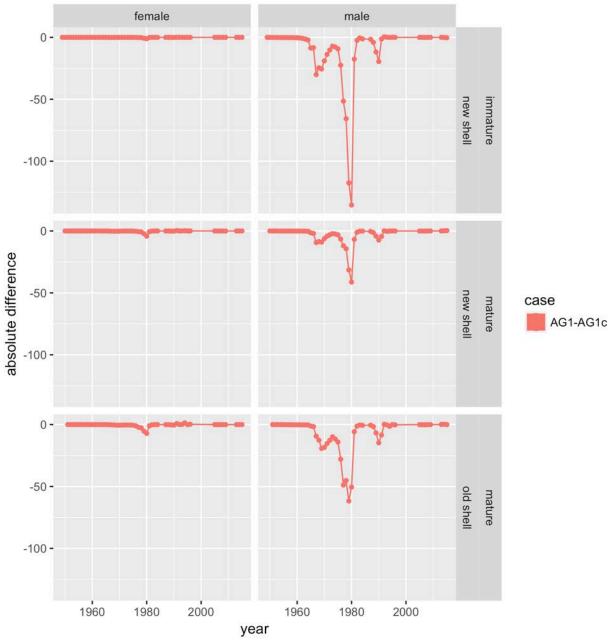


Figure 80. Differences for TCF: fishery catch abundance.

#### SCF: fishery catch abundance

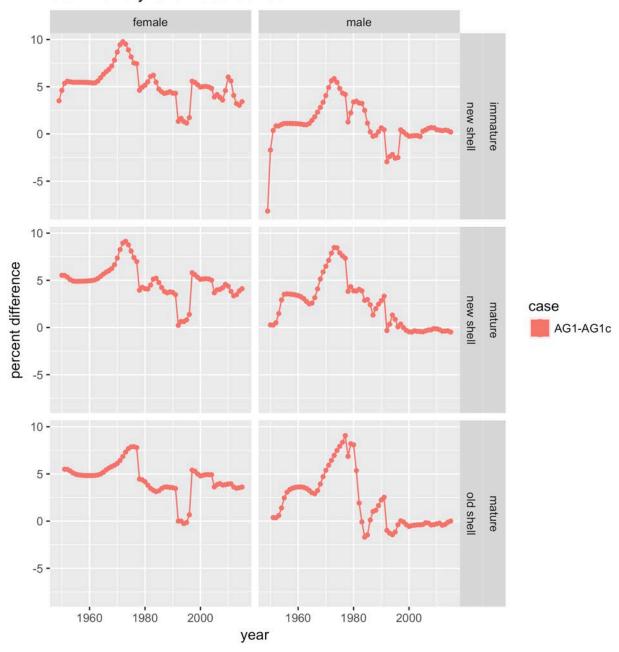


Figure 81. Differences for SCF: fishery catch abundance.

#### SCF: fishery catch abundance

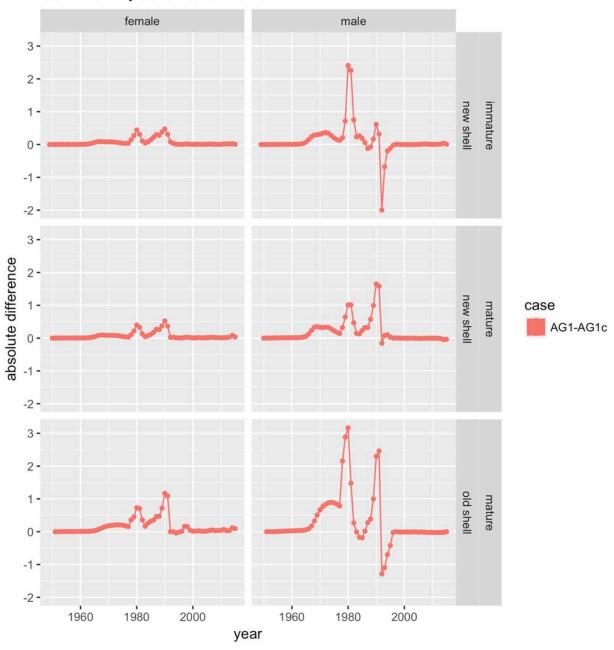


Figure 82. Differences for SCF: fishery catch abundance.

#### GTF: fishery catch abundance

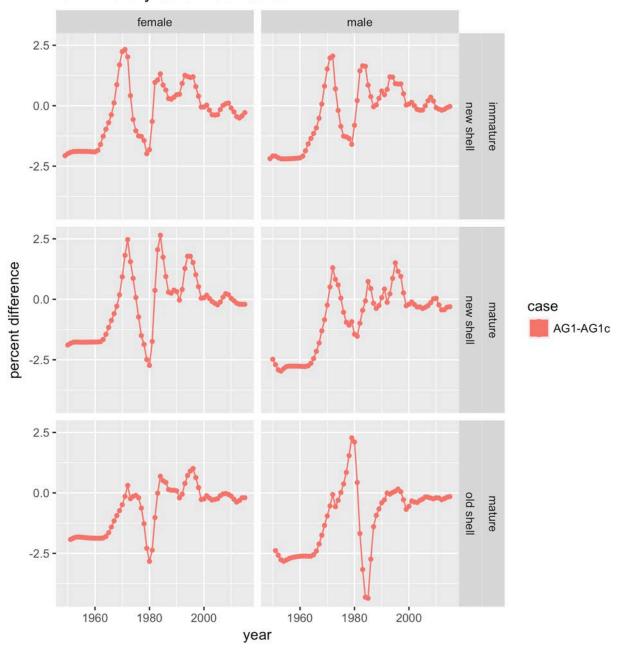


Figure 83. Differences for GTF: fishery catch abundance.

#### GTF: fishery catch abundance

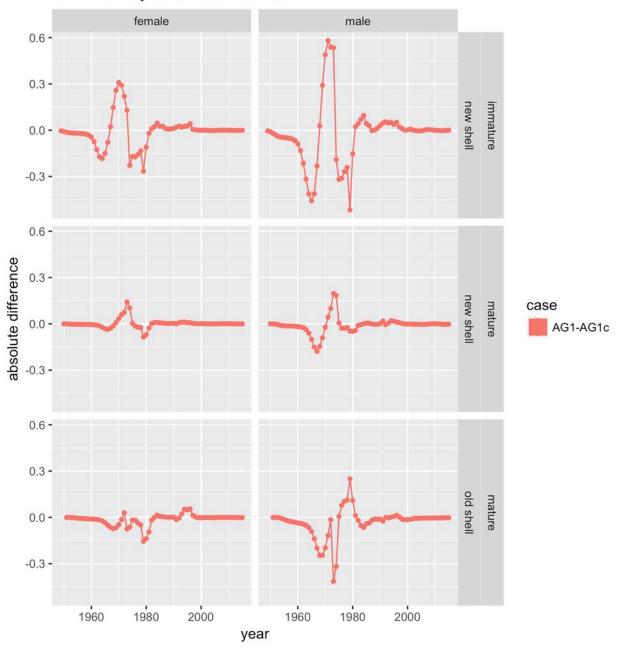


Figure 84. Differences for GTF: fishery catch abundance.

#### RKF: fishery catch abundance

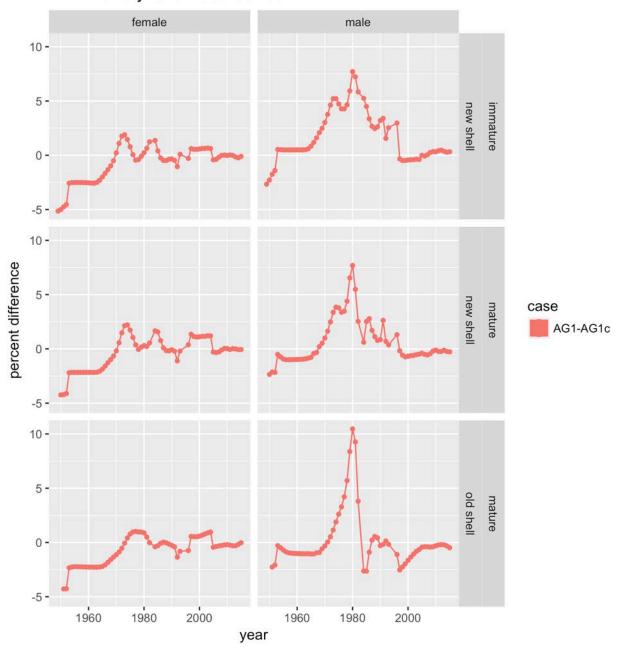


Figure 85. Differences for RKF: fishery catch abundance.

#### RKF: fishery catch abundance

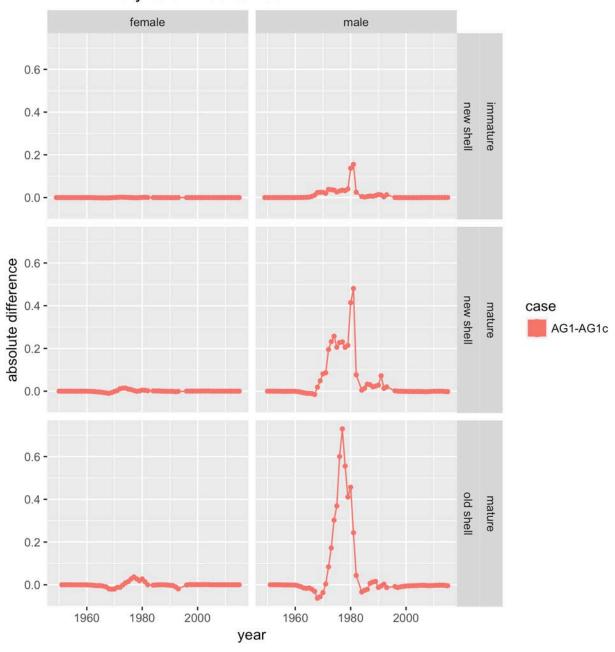


Figure 86. Differences for RKF: fishery catch abundance.

# TCF fishery catch abundance for female immature new shell

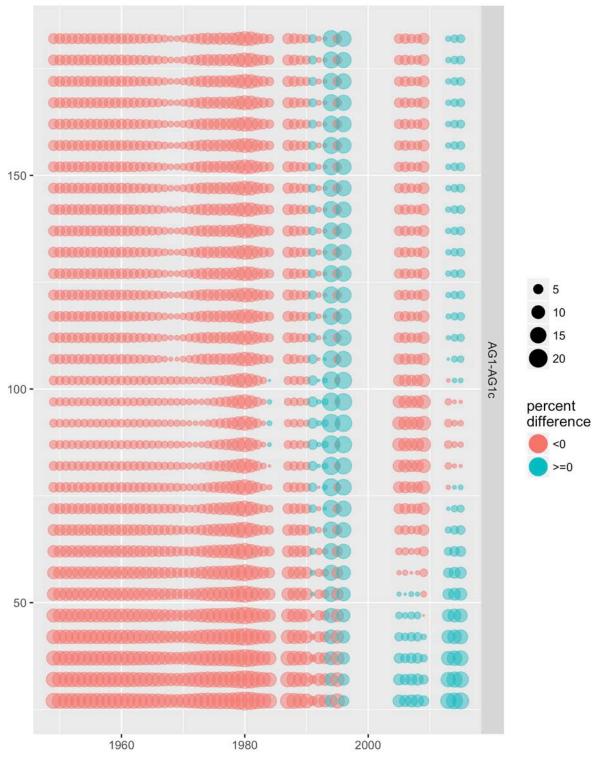


Figure 87. Differences for TCF fishery catch abundance for female immature new shell.

## TCF fishery catch abundance for female mature new shell

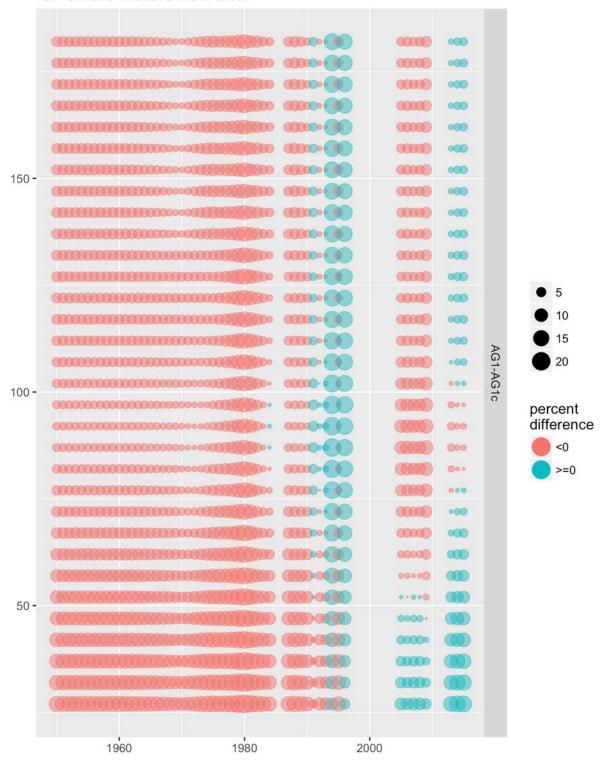


Figure 88. Differences for TCF fishery catch abundance for female mature new shell.

#### TCF fishery catch abundance for female mature old shell

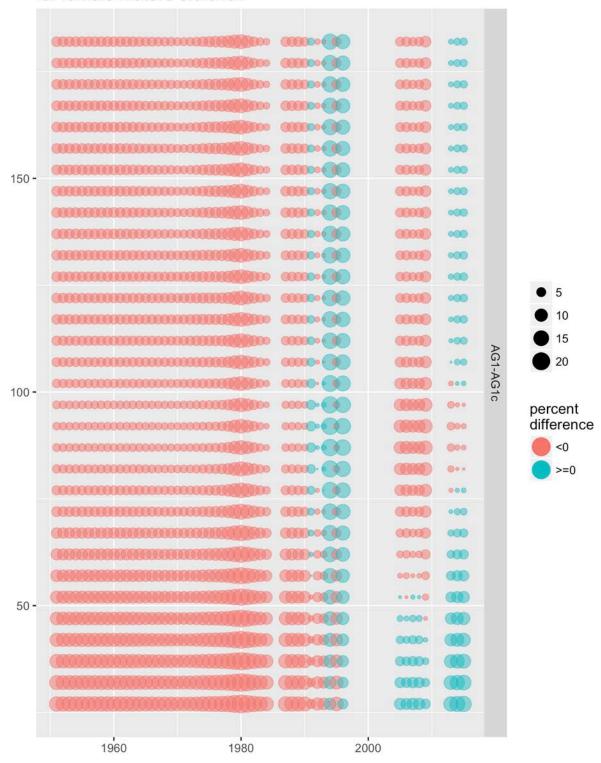


Figure 89. Differences for TCF fishery catch abundance for female mature old shell.

#### TCF fishery catch abundance for male immature new shell

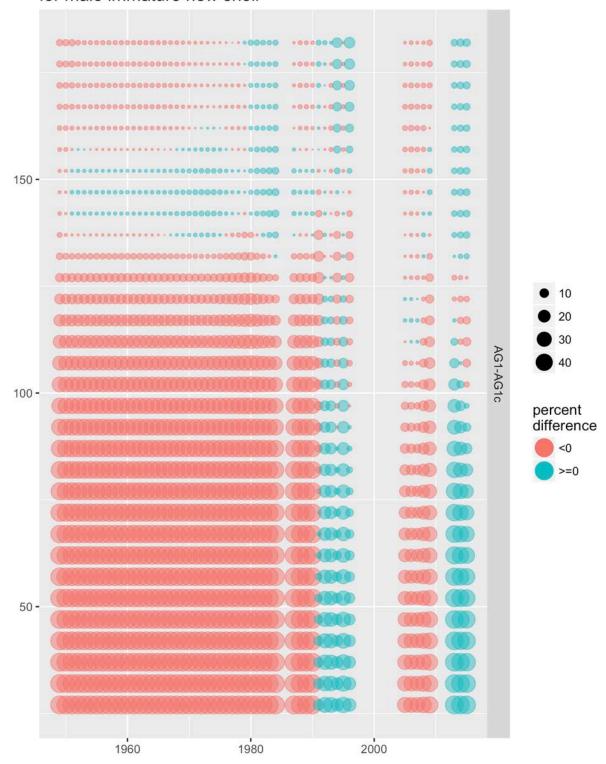


Figure 90. Differences for TCF fishery catch abundance for male immature new shell.

#### TCF fishery catch abundance for male mature new shell

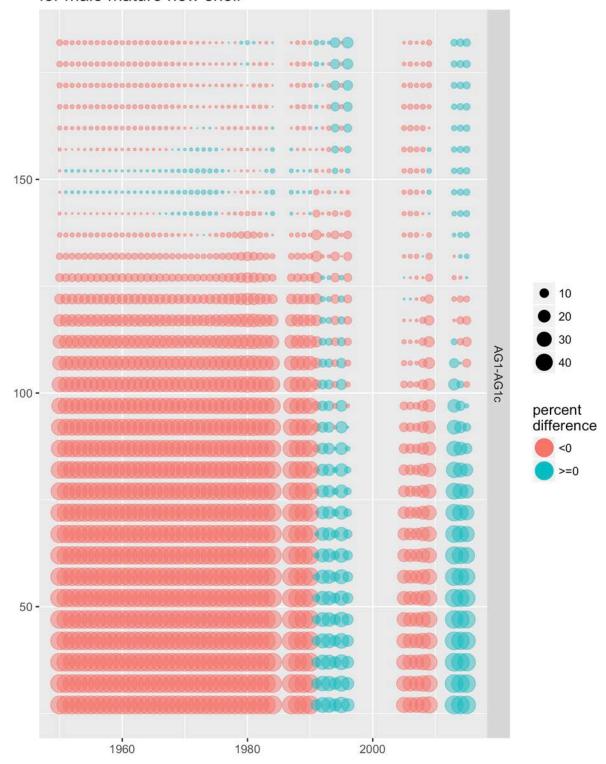


Figure 91. Differences for TCF fishery catch abundance for male mature new shell.

## TCF fishery catch abundance for male mature old shell

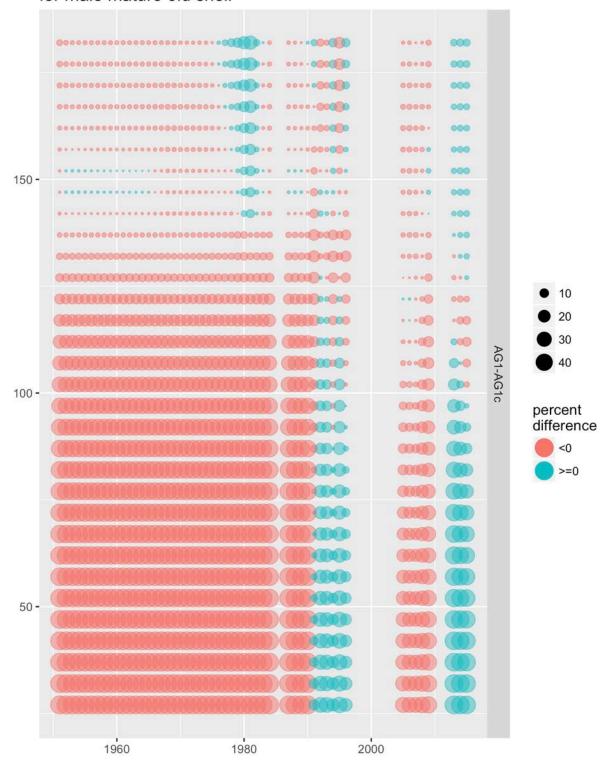


Figure 92. Differences for TCF fishery catch abundance for male mature old shell.

#### TCF fishery catch abundance for female immature new shell

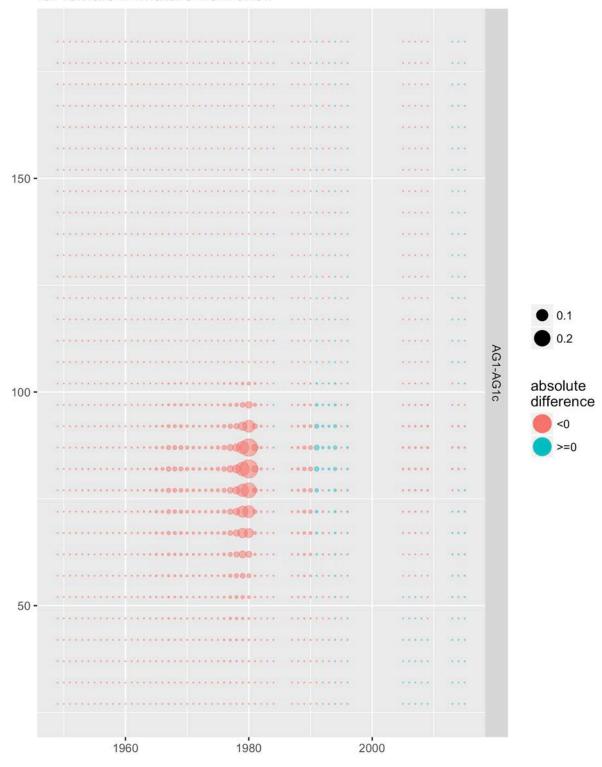


Figure 93. Differences for TCF fishery catch abundance for female immature new shell.

#### TCF fishery catch abundance for female mature new shell

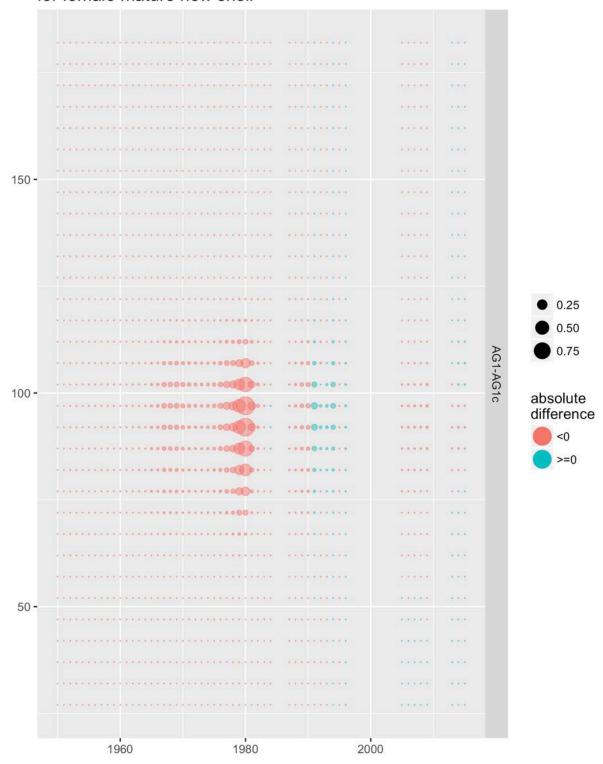


Figure 94. Differences for TCF fishery catch abundance for female mature new shell.

#### TCF fishery catch abundance for female mature old shell

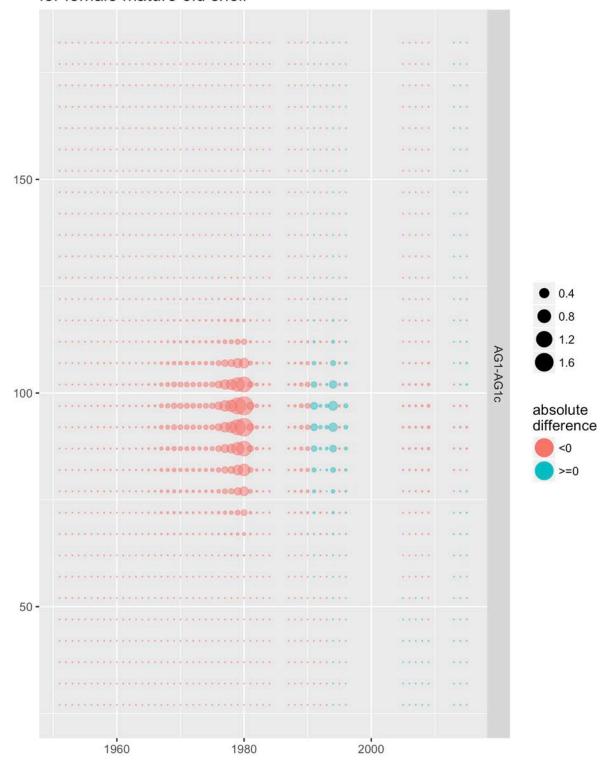


Figure 95. Differences for TCF fishery catch abundance for female mature old shell.

#### TCF fishery catch abundance for male immature new shell

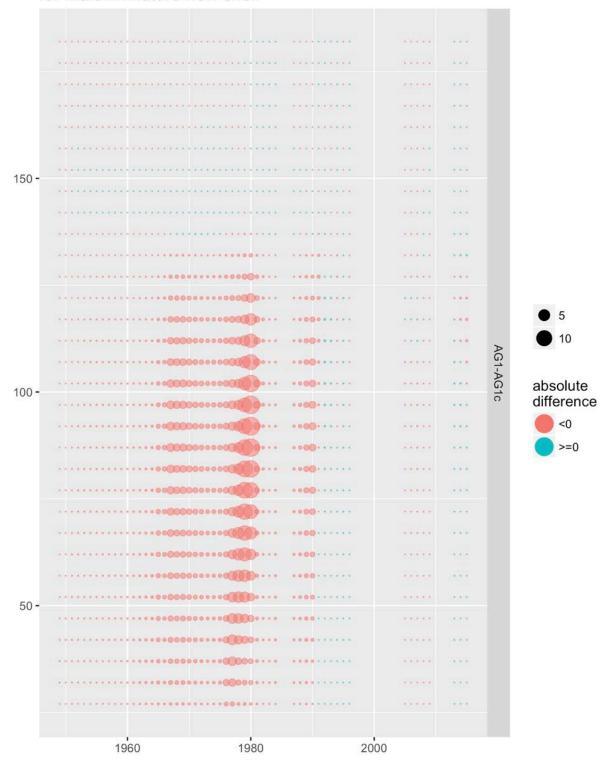


Figure 96. Differences for TCF fishery catch abundance for male immature new shell.

## TCF fishery catch abundance for male mature new shell

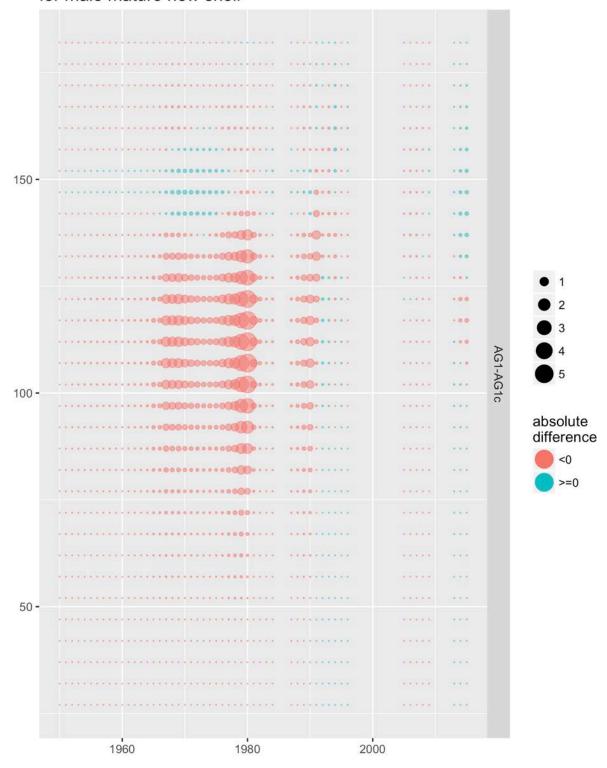


Figure 97. Differences for TCF fishery catch abundance for male mature new shell.

#### TCF fishery catch abundance for male mature old shell

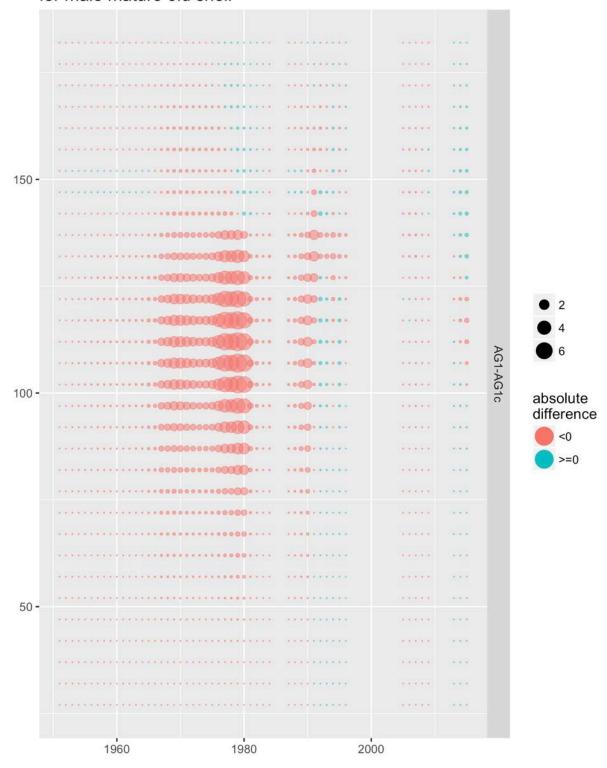


Figure 98. Differences for TCF fishery catch abundance for male mature old shell.

# SCF fishery catch abundance for female immature new shell

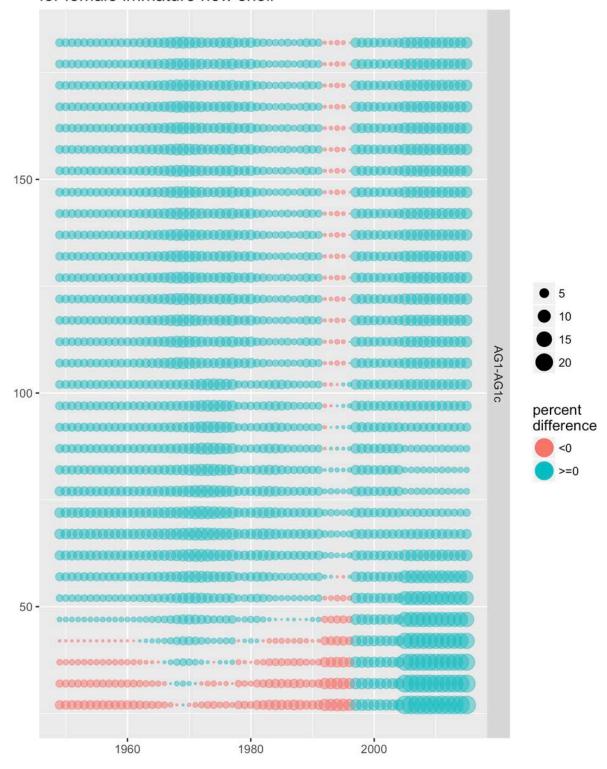


Figure 99. Differences for SCF fishery catch abundance for female immature new shell.

# SCF fishery catch abundance for female mature new shell

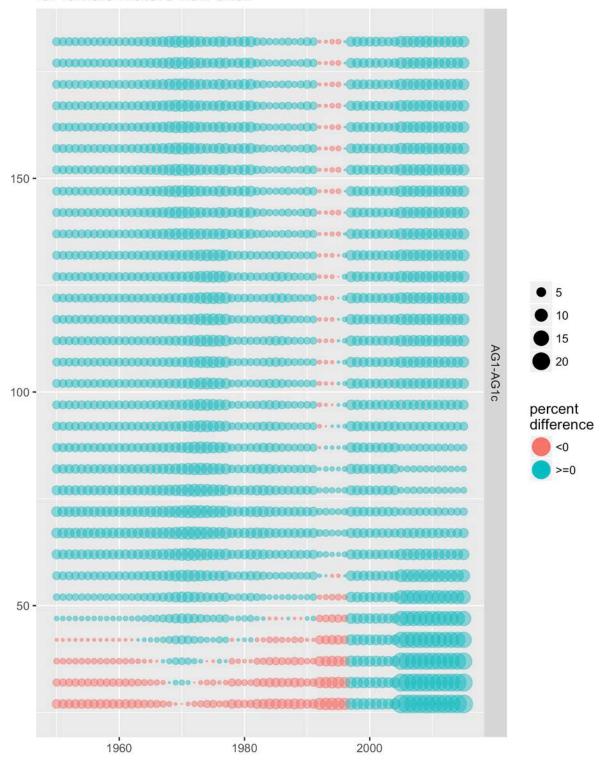


Figure 100. Differences for SCF fishery catch abundance for female mature new shell.

# SCF fishery catch abundance for female mature old shell

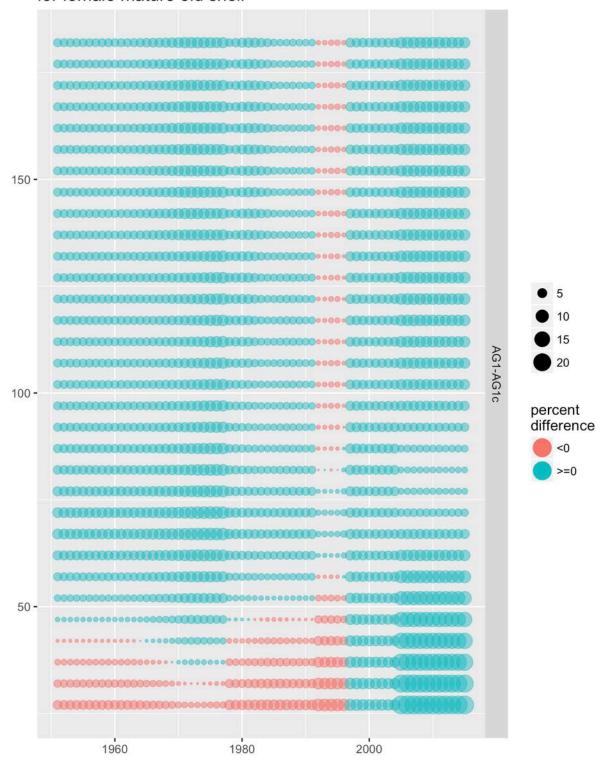


Figure 101. Differences for SCF fishery catch abundance for female mature old shell.

# SCF fishery catch abundance for male immature new shell

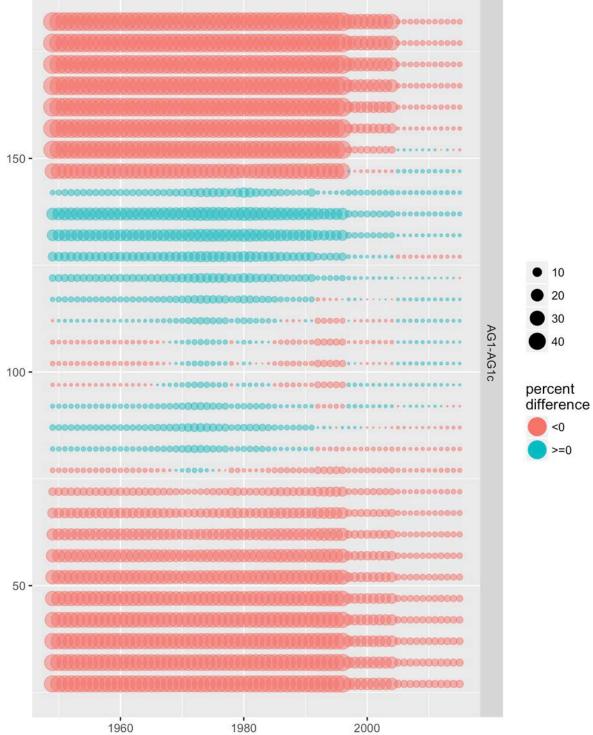


Figure 102. Differences for SCF fishery catch abundance for male immature new shell.

# SCF fishery catch abundance for male mature new shell

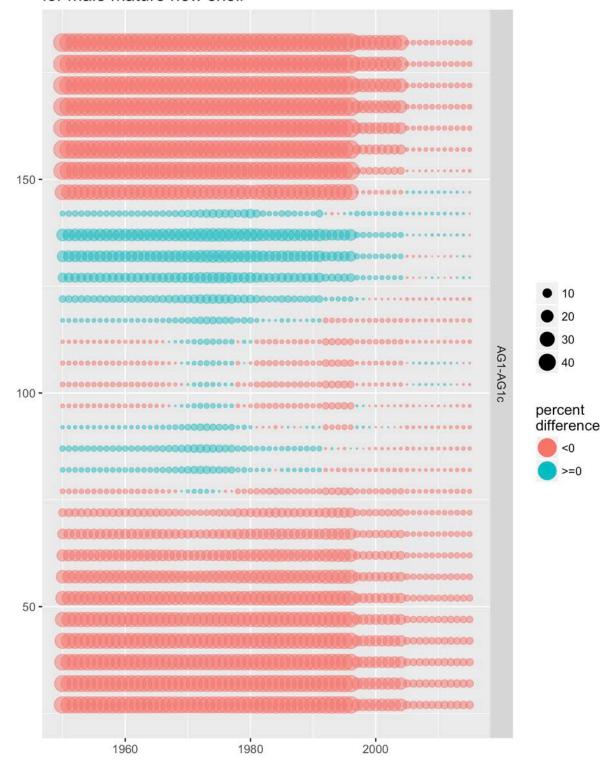


Figure 103. Differences for SCF fishery catch abundance for male mature new shell.

# SCF fishery catch abundance for male mature old shell

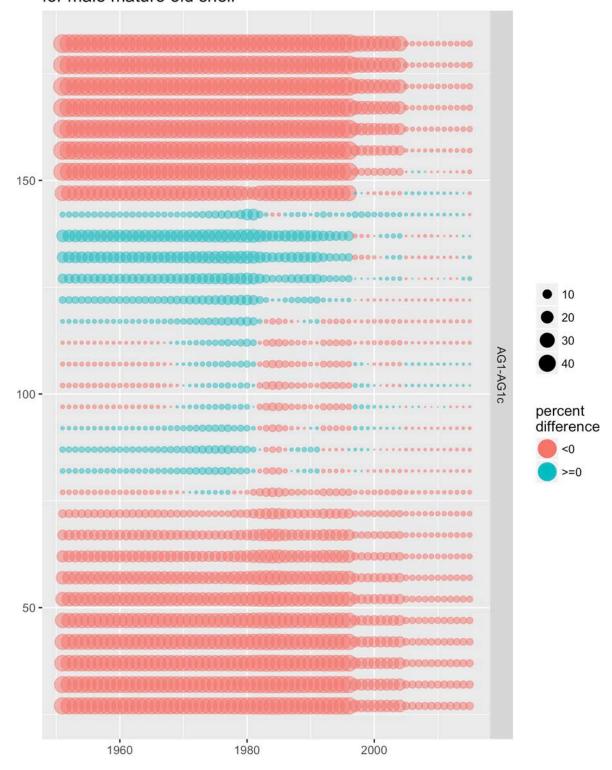


Figure 104. Differences for SCF fishery catch abundance for male mature old shell.

# SCF fishery catch abundance for female immature new shell

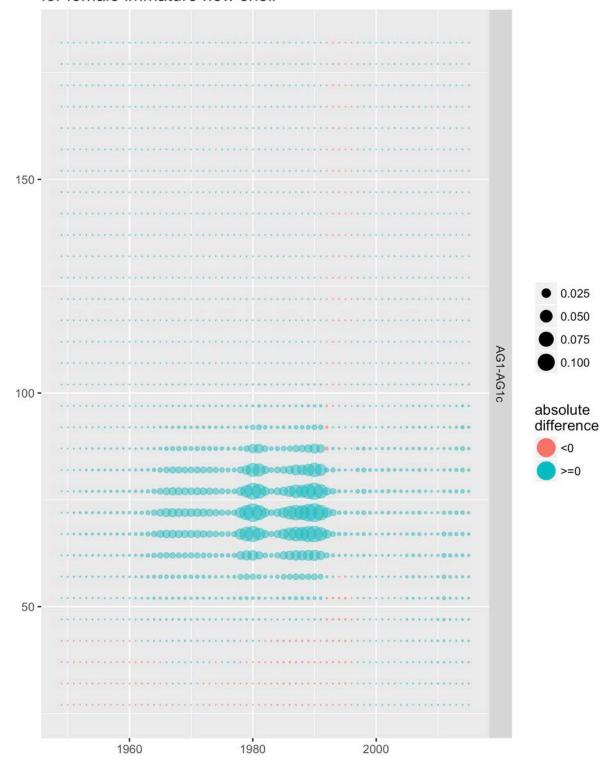


Figure 105. Differences for SCF fishery catch abundance for female immature new shell.

# SCF fishery catch abundance for female mature new shell

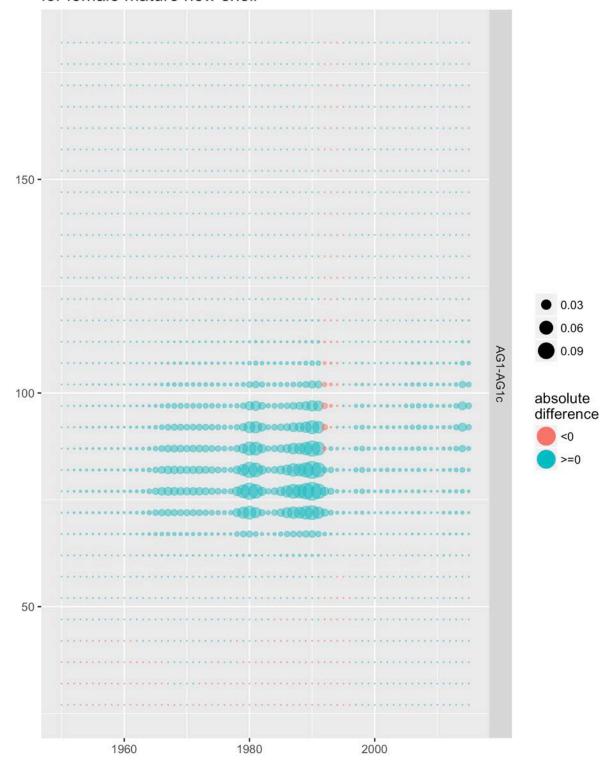


Figure 106. Differences for SCF fishery catch abundance for female mature new shell.

# SCF fishery catch abundance for female mature old shell

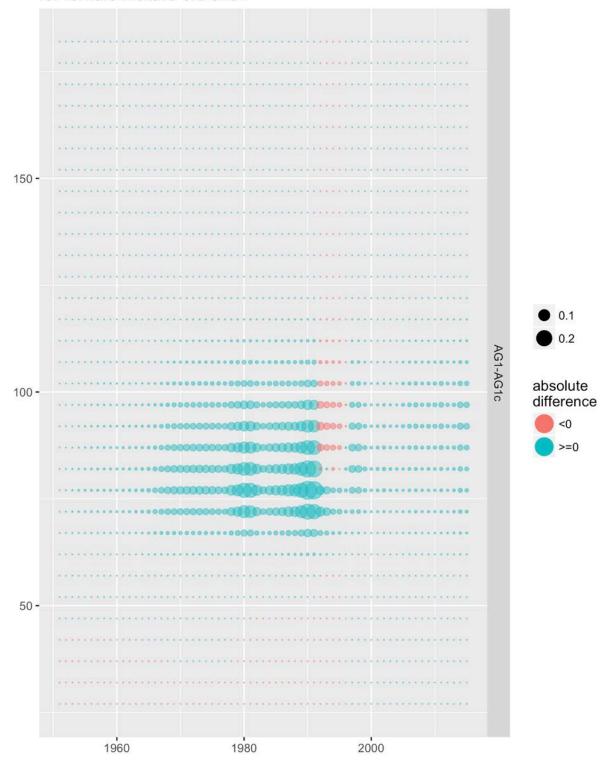


Figure 107. Differences for SCF fishery catch abundance for female mature old shell.

# SCF fishery catch abundance for male immature new shell

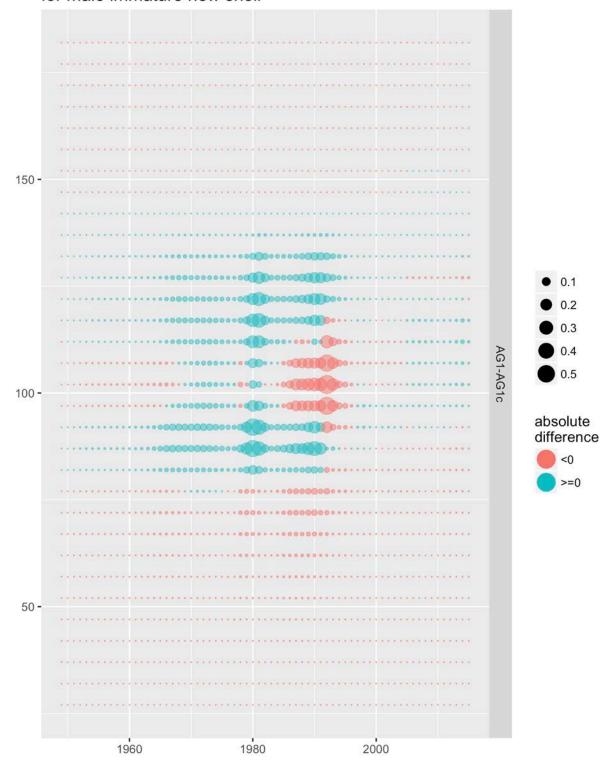


Figure 108. Differences for SCF fishery catch abundance for male immature new shell.

# SCF fishery catch abundance for male mature new shell

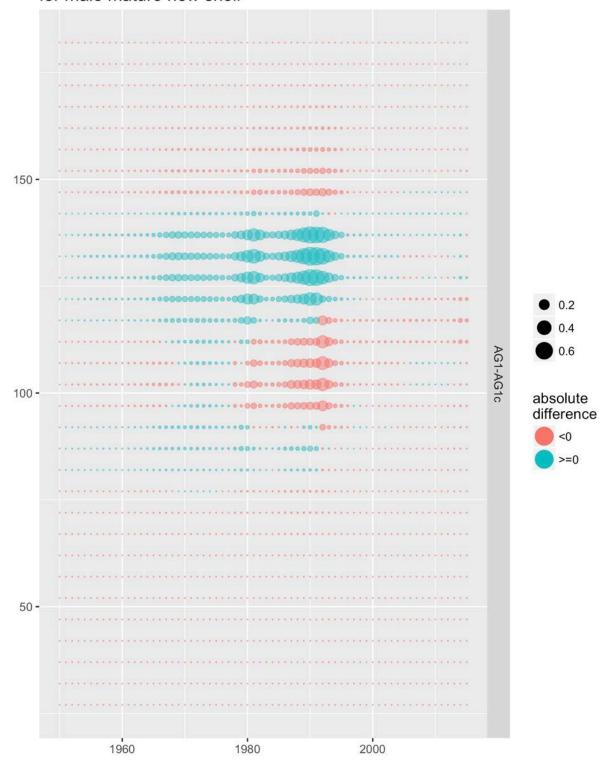


Figure 109. Differences for SCF fishery catch abundance for male mature new shell.

# SCF fishery catch abundance for male mature old shell

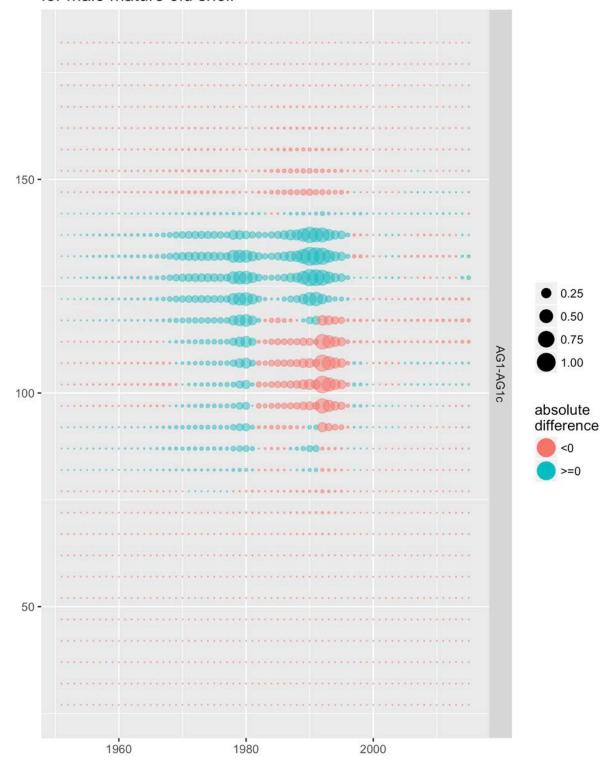


Figure 110. Differences for SCF fishery catch abundance for male mature old shell.

# GTF fishery catch abundance for female immature new shell

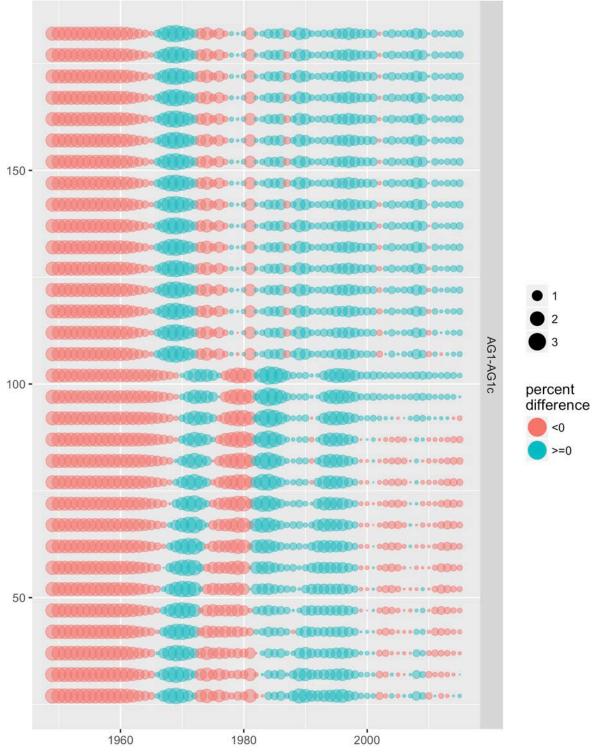


Figure 111. Differences for GTF fishery catch abundance for female immature new shell.

# GTF fishery catch abundance for female mature new shell

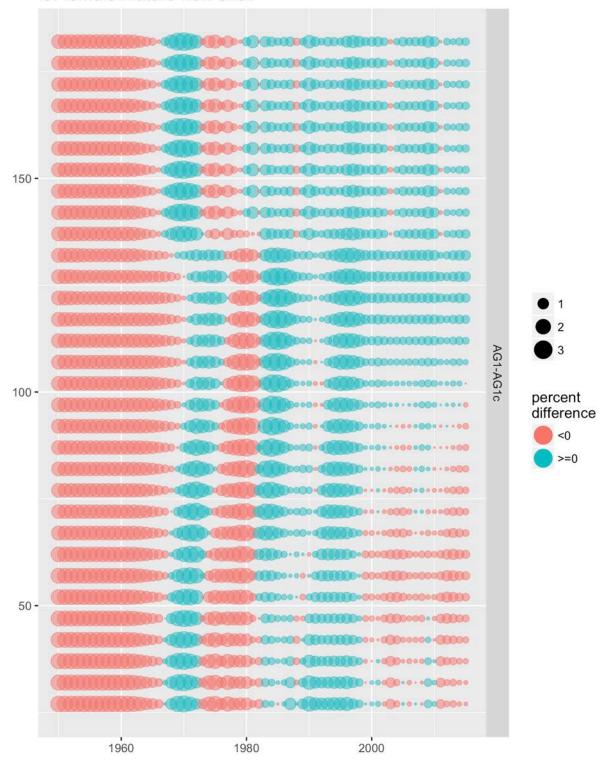


Figure 112. Differences for GTF fishery catch abundance for female mature new shell.

# GTF fishery catch abundance for female mature old shell

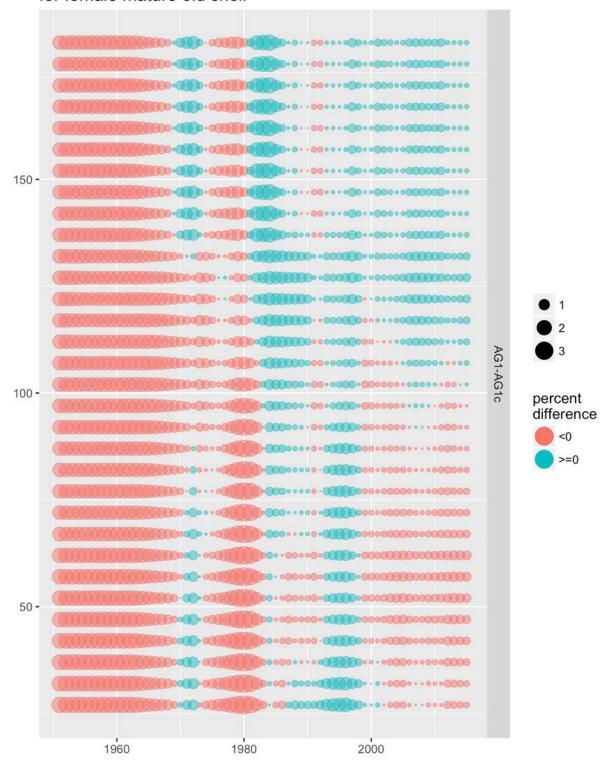


Figure 113. Differences for GTF fishery catch abundance for female mature old shell.

#### GTF fishery catch abundance for male immature new shell

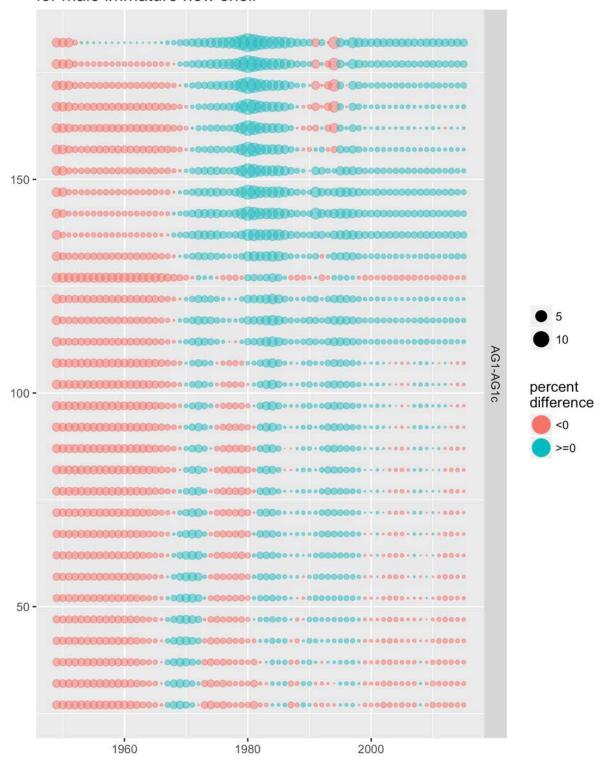


Figure 114. Differences for GTF fishery catch abundance for male immature new shell.

#### GTF fishery catch abundance for male mature new shell

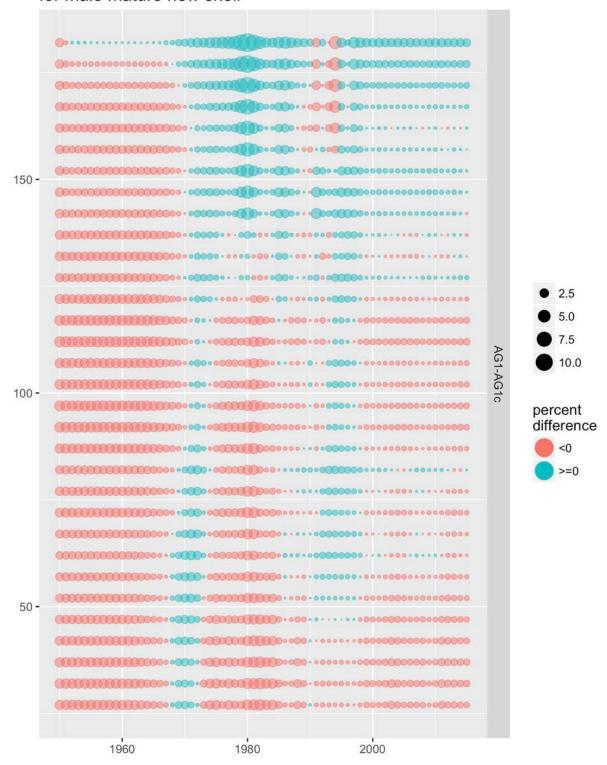


Figure 115. Differences for GTF fishery catch abundance for male mature new shell.

#### GTF fishery catch abundance for male mature old shell

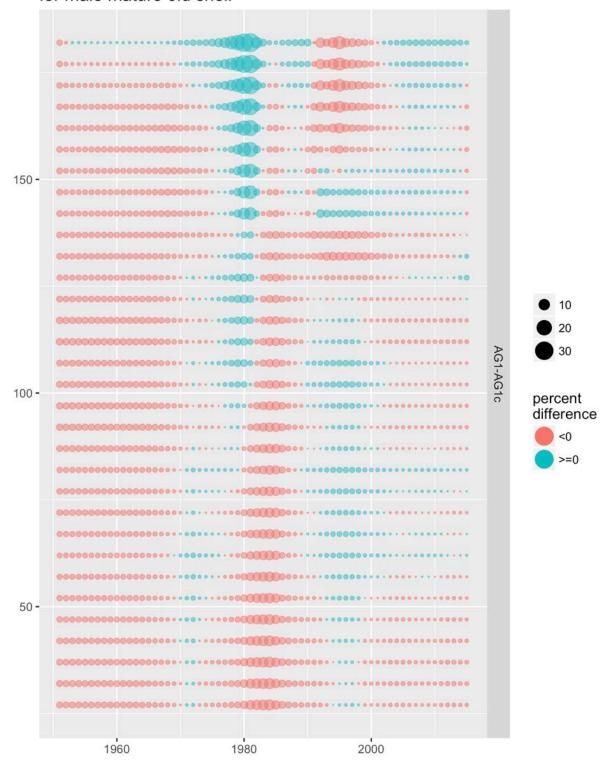


Figure 116. Differences for GTF fishery catch abundance for male mature old shell.

# GTF fishery catch abundance for female immature new shell

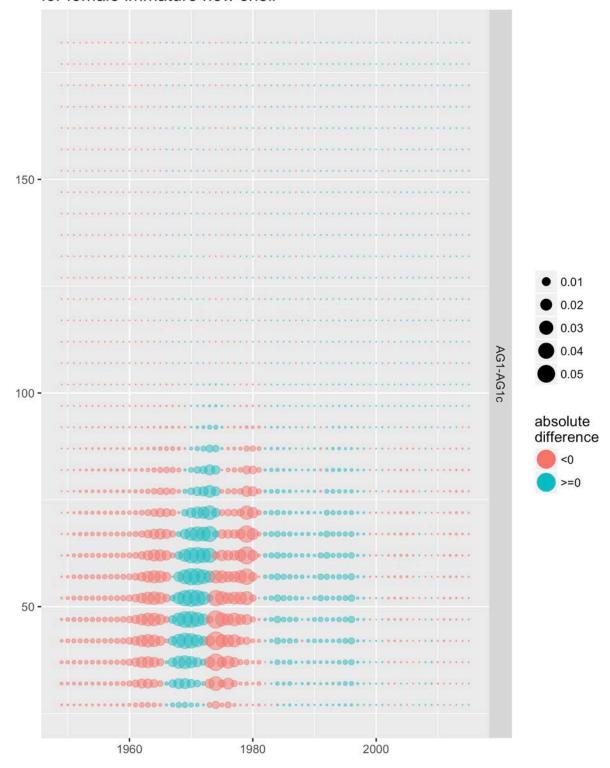


Figure 117. Differences for GTF fishery catch abundance for female immature new shell.

# GTF fishery catch abundance for female mature new shell

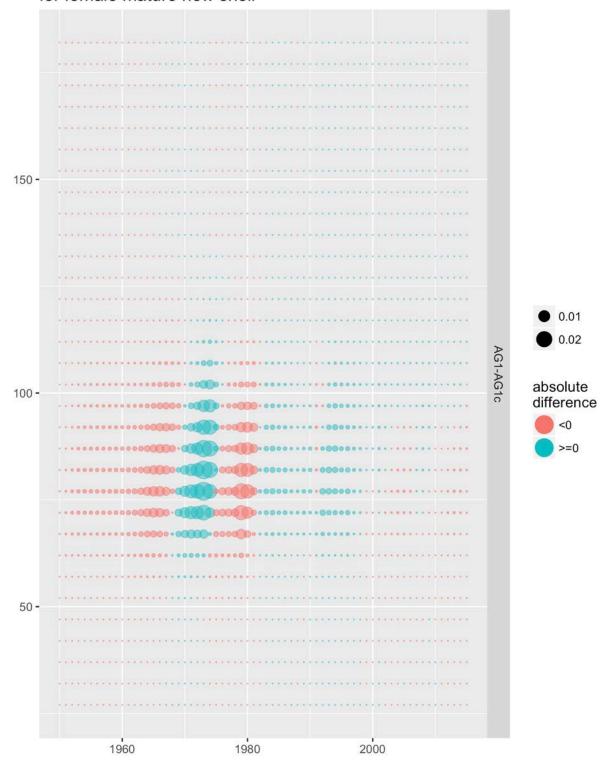


Figure 118. Differences for GTF fishery catch abundance for female mature new shell.

# GTF fishery catch abundance for female mature old shell

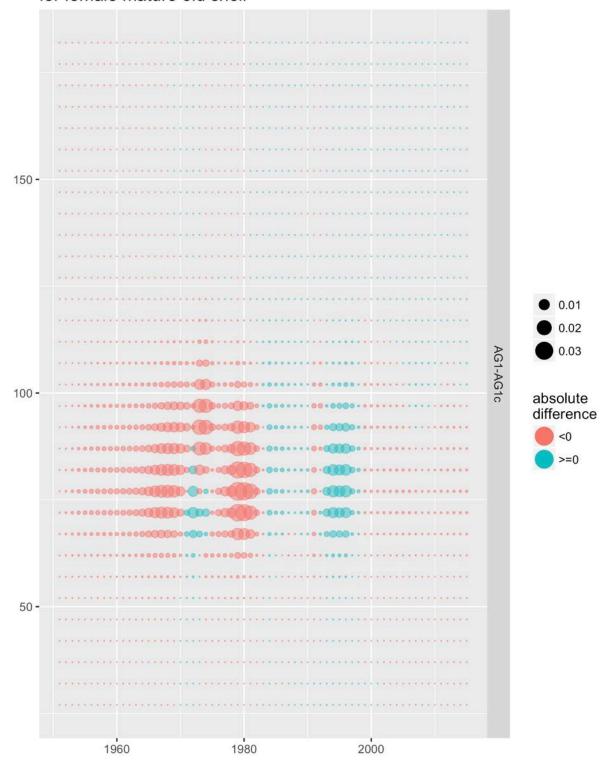


Figure 119. Differences for GTF fishery catch abundance for female mature old shell.

### GTF fishery catch abundance for male immature new shell

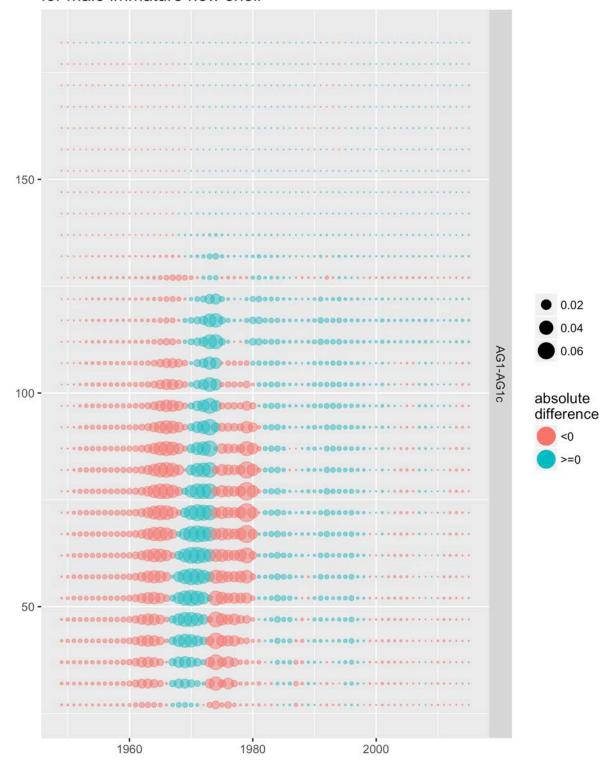


Figure 120. Differences for GTF fishery catch abundance for male immature new shell.

# GTF fishery catch abundance for male mature new shell

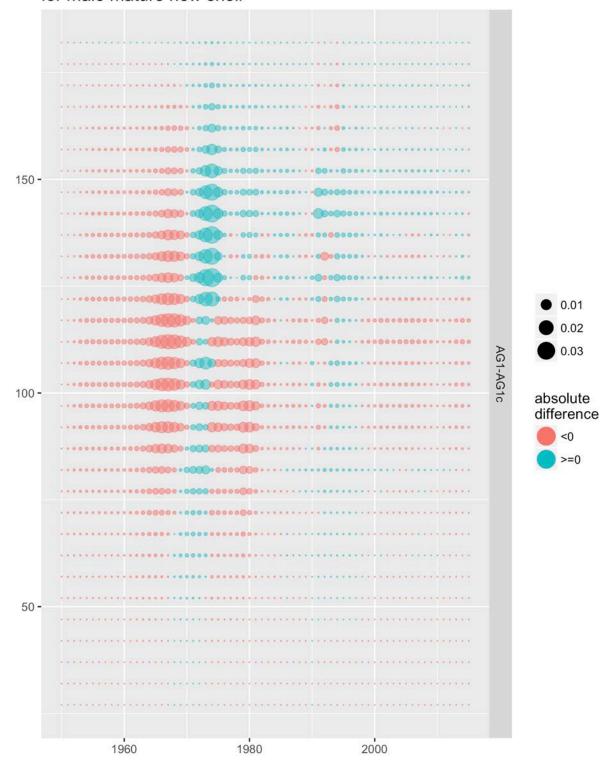


Figure 121. Differences for GTF fishery catch abundance for male mature new shell.

### GTF fishery catch abundance for male mature old shell

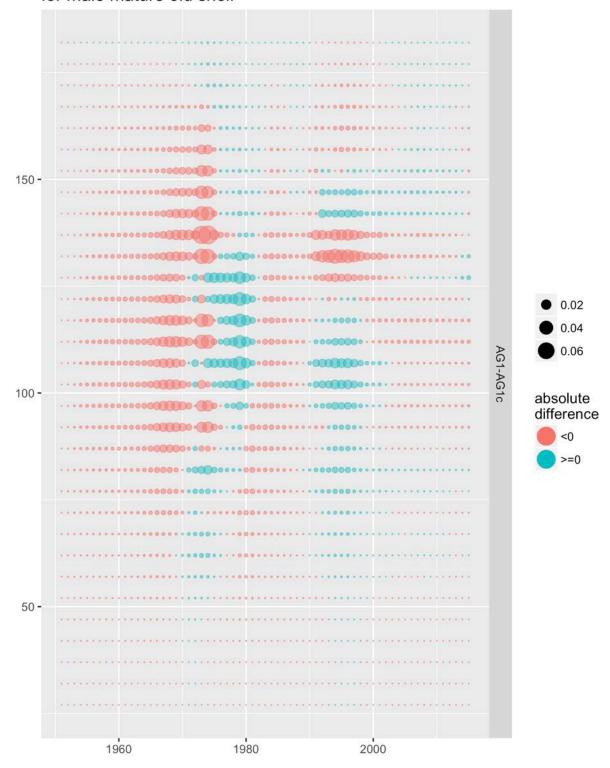


Figure 122. Differences for GTF fishery catch abundance for male mature old shell.

# RKF fishery catch abundance for female immature new shell 150 -100 percent difference <0 >=0

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

1980

2000

50 -

1960

# RKF fishery catch abundance for female mature new shell

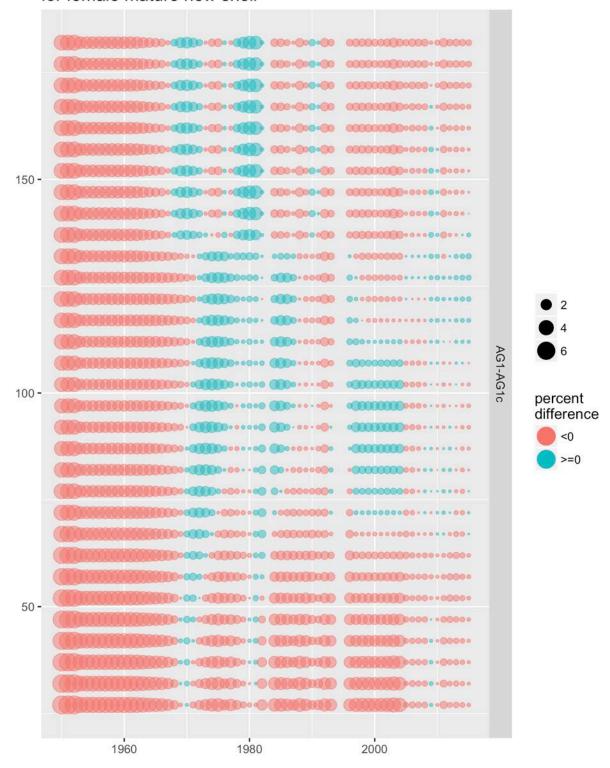


Figure 124. Differences for RKF fishery catch abundance for female mature new shell.

# RKF fishery catch abundance for female mature old shell

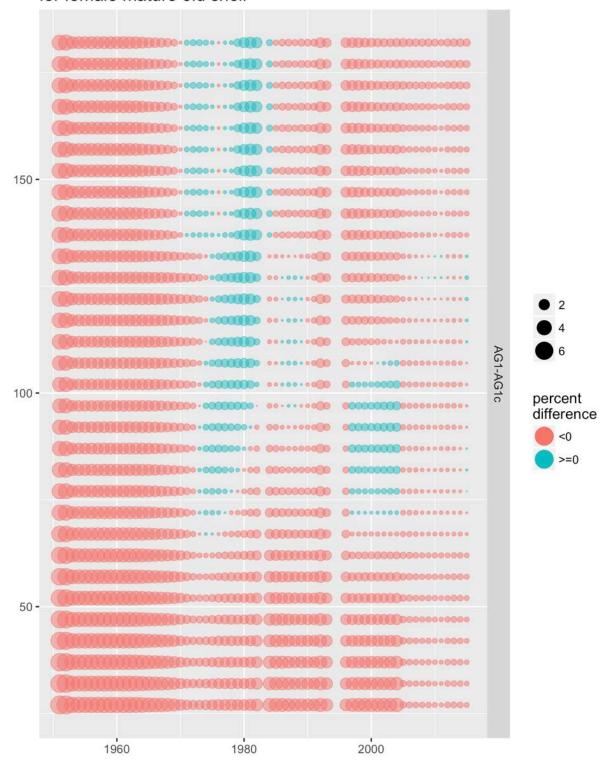


Figure 125. Differences for RKF fishery catch abundance for female mature old shell.

#### RKF fishery catch abundance for male immature new shell

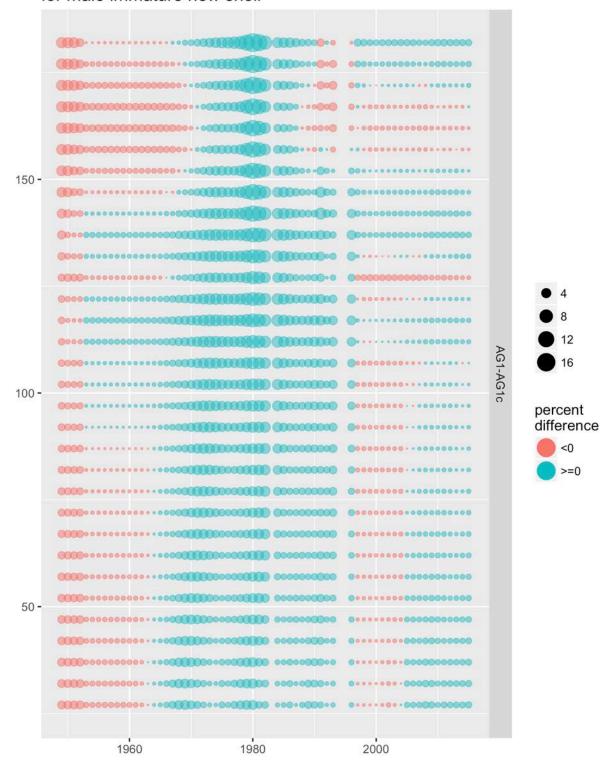


Figure 126. Differences for RKF fishery catch abundance for male immature new shell.

#### RKF fishery catch abundance for male mature new shell

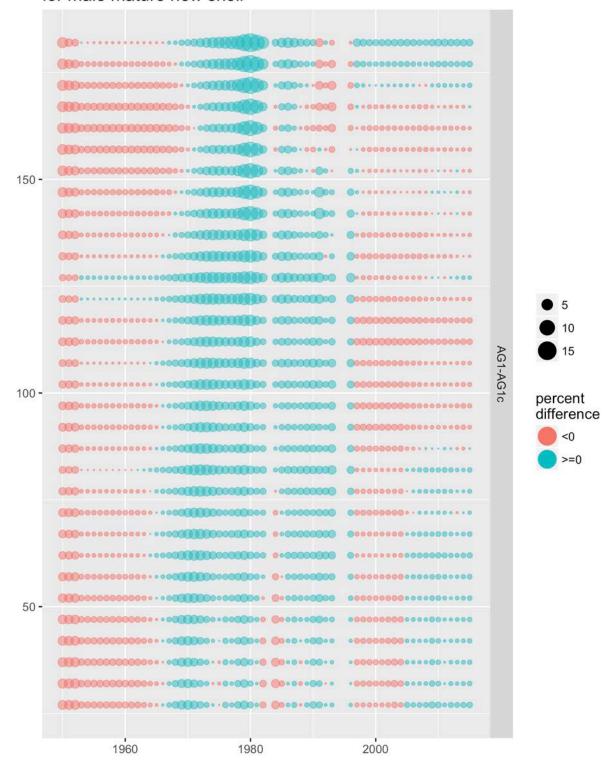


Figure 127. Differences for RKF fishery catch abundance for male mature new shell.

#### RKF fishery catch abundance for male mature old shell

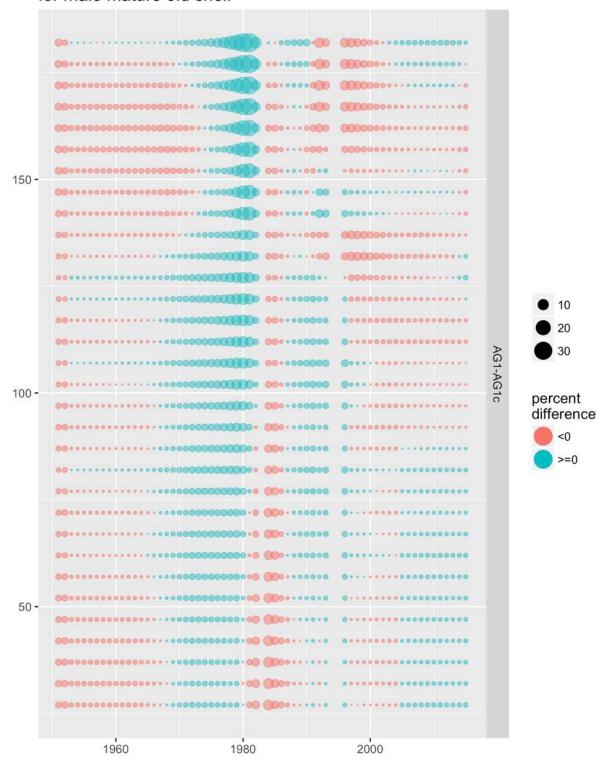


Figure 128. Differences for RKF fishery catch abundance for male mature old shell.

# RKF fishery catch abundance for female immature new shell

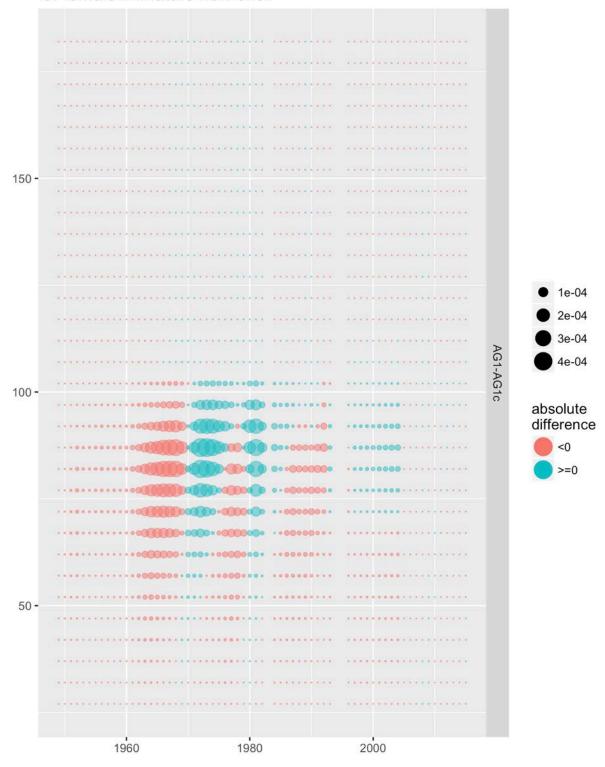


Figure 129. Differences for RKF fishery catch abundance for female immature new shell.

# RKF fishery catch abundance for female mature new shell

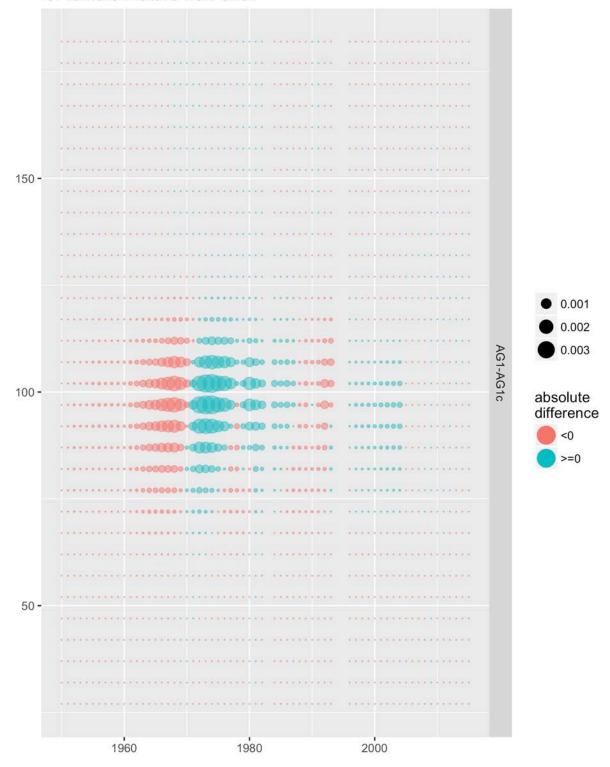


Figure 130. Differences for RKF fishery catch abundance for female mature new shell.

### RKF fishery catch abundance for female mature old shell

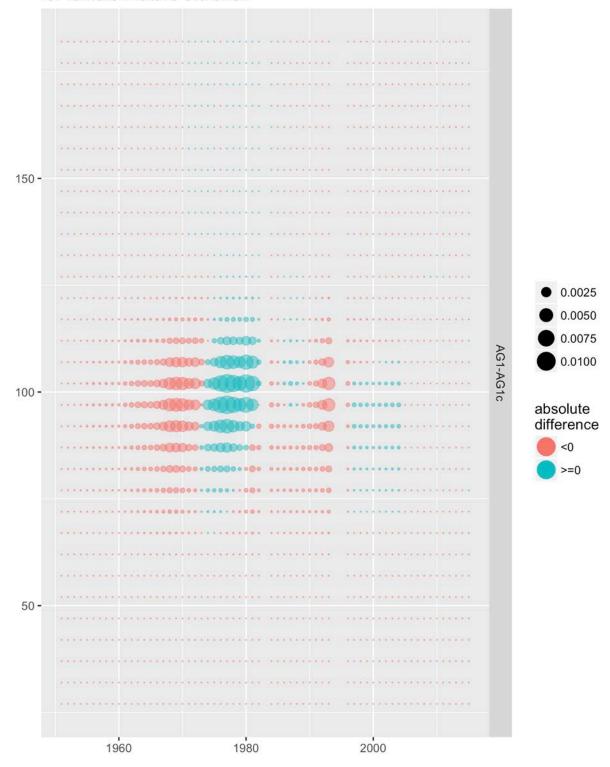


Figure 131. Differences for RKF fishery catch abundance for female mature old shell.

### RKF fishery catch abundance for male immature new shell

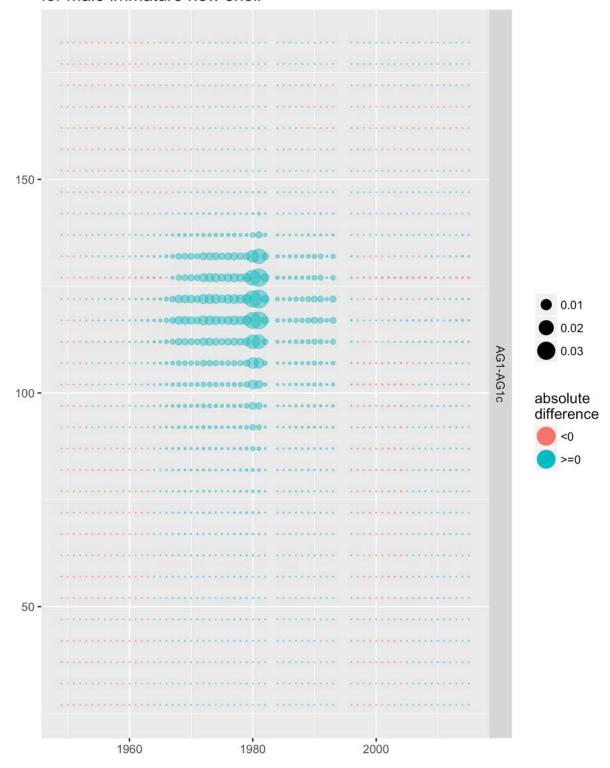


Figure 132. Differences for RKF fishery catch abundance for male immature new shell.

# RKF fishery catch abundance for male mature new shell

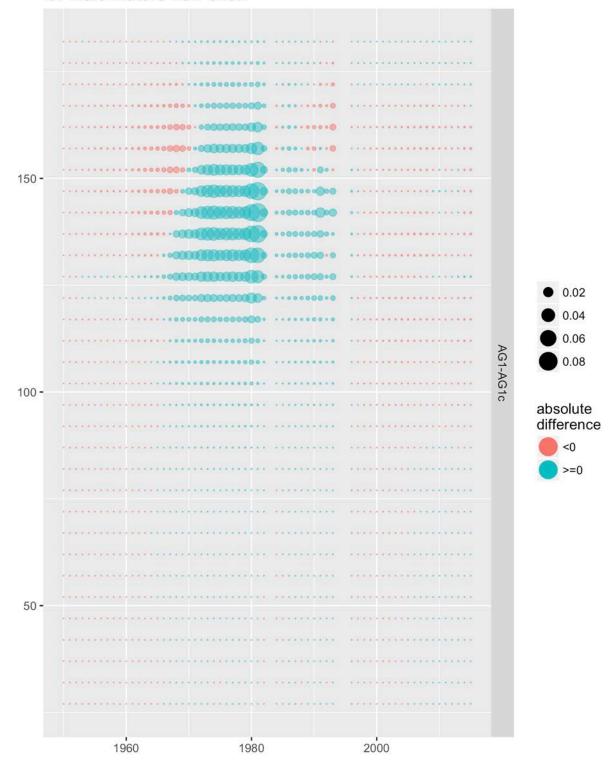


Figure 133. Differences for RKF fishery catch abundance for male mature new shell.

# RKF fishery catch abundance for male mature old shell

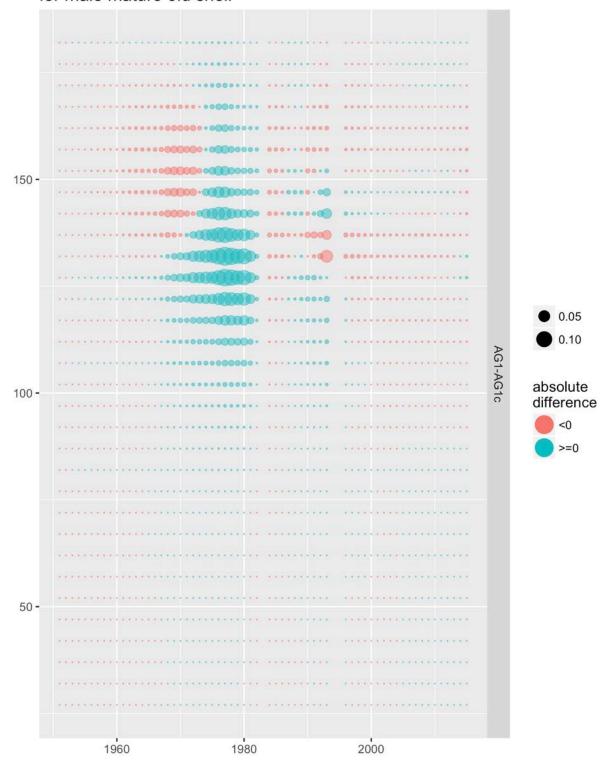


Figure 134. Differences for RKF fishery catch abundance for male mature old shell.

#### **Total catch biomass**

#### TCF: fishery total biomass

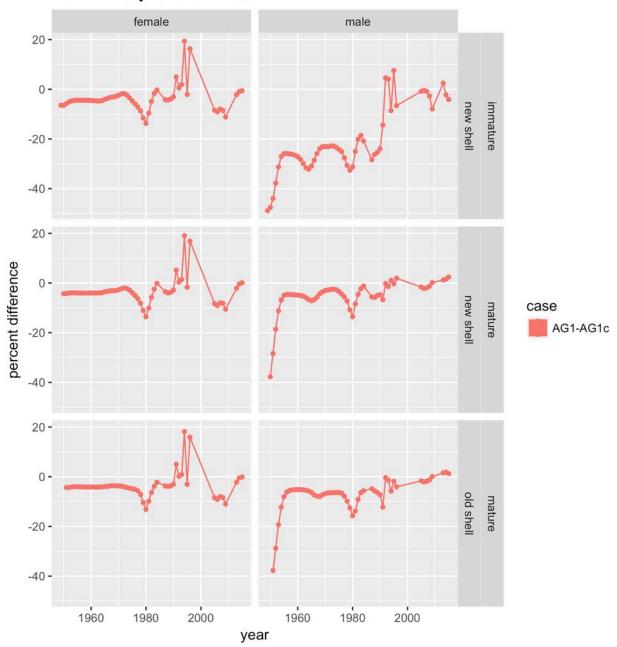


Figure 135. Differences for TCF: fishery total biomass.

#### TCF: fishery total biomass female male 0 --10 new shell -20 **-**-30 **-**0 absolute difference -10 new shell case AG1-AG1c -20 --30 -0 --10 old shell -20 **-**-30 -1960 1980 2000 1960 1980 2000

Figure 136. Differences for TCF: fishery total biomass.

year

#### SCF: fishery total biomass

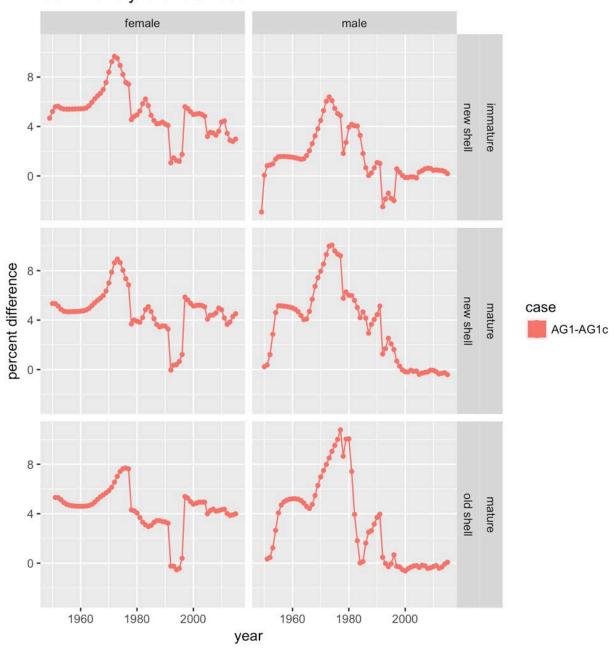


Figure 137. Differences for SCF: fishery total biomass.

#### SCF: fishery total biomass

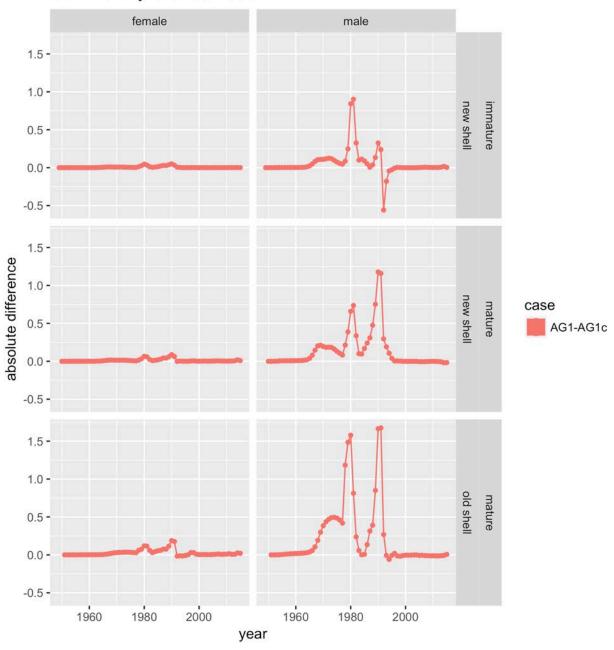


Figure 138. Differences for SCF: fishery total biomass.

#### GTF: fishery total biomass

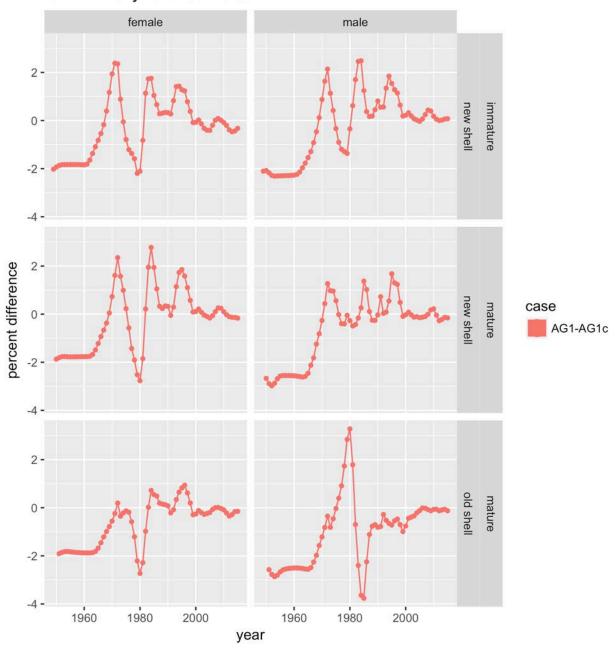


Figure 139. Differences for GTF: fishery total biomass.

#### GTF: fishery total biomass

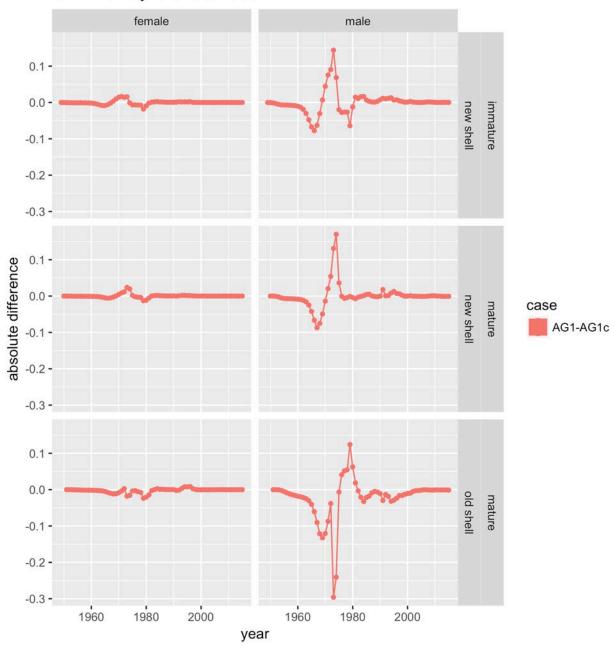


Figure 140. Differences for GTF: fishery total biomass.

#### RKF: fishery total biomass

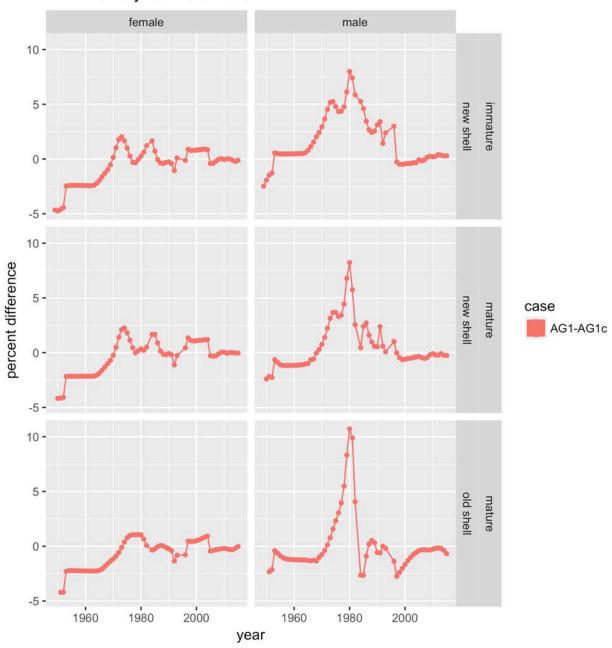


Figure 141. Differences for RKF: fishery total biomass.

#### RKF: fishery total biomass

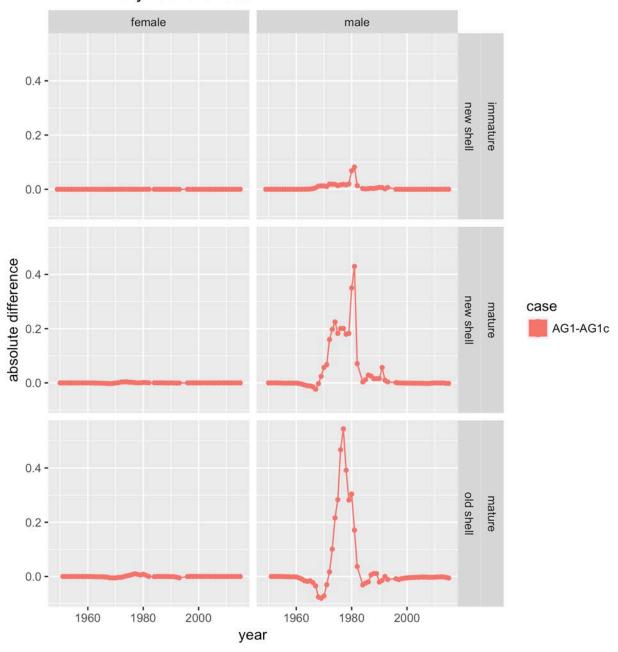


Figure 142. Differences for RKF: fishery total biomass.

#### **Retained catch abundance**

#### TCF: retained catch abundance

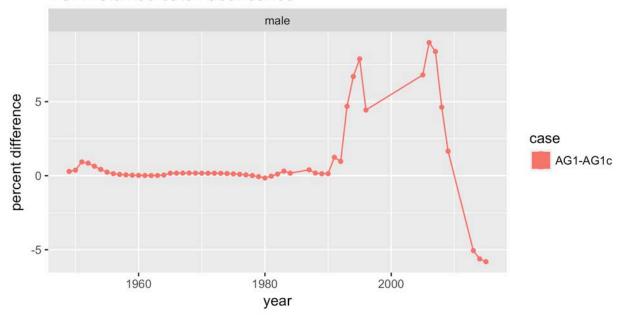


Figure 143. Differences for TCF: retained catch abundance.



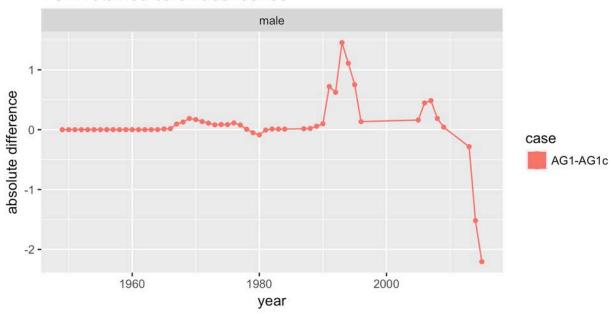


Figure 144. Differences for TCF: retained catch abundance.

#### **Retained catch biomass**

#### TCF: retained catch biomass

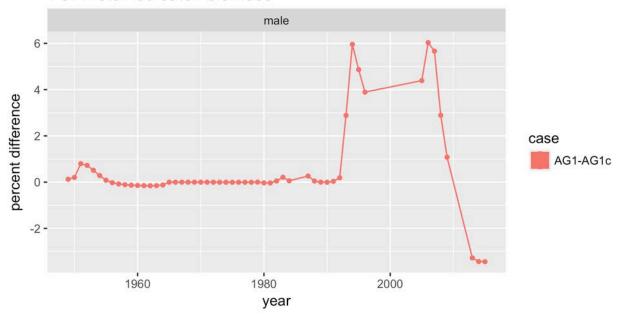
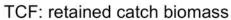


Figure 145. Differences for TCF: retained catch biomass.



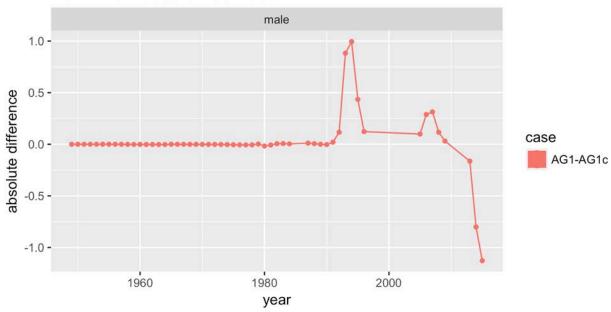


Figure 146. Differences for TCF: retained catch biomass.