

9. Figure List

- Figure 1.** Location of the twelve Commonwealth MPAs considered in this study.
- Figure 2.** The boundary and location of the twelve Australian Commonwealth MPAs.
- Figure 3.** Examples of SST (upper panel) and SSC (lower panels) images.
- Figure 4.** Transects used to determine the size of the habitat for each MPA.
- Figure 5.** SST habitat edge detection definition.
- Figure 6.** Relationship between the size of each MPA and the number of pixels that were sampled each date to provide the data.
- Figure 7.** Number of pixels sampled for each data to produce the SST data for each MPA.
- Figure 8.** Number of pixels sampled for each data to produce the SSC data for each MPA.
- Figure 9.** SST climatology for the period 1991-1999 at the twelve Commonwealth MPAs.
- Figure 10.** SSC climatology for the period 1997-1999 at the twelve Commonwealth MPAs.
- Figure 11.** SST medians for each MPA, together with the climatology ($\pm 2SD$).
- Figure 12.** SSC medians for each MPA, together with the climatology ($\pm 2SD$).
- Figure 13.** SST maximum and minimum values for each date in each MPA.
- Figure 14.** SSC maximum and minimum values for each date in each MPA.
- Figure 15.** The time series of median SST at Ashmore Reef.
- Figure 16.** The time series of median SST at Cartier Island.
- Figure 17.** The time series of median SST at Mermaid Reef.
- Figure 18.** The time series of median SST at Ningaloo.
- Figure 19.** The time series of median SST at Great Australian Bight.
- Figure 20.** The time series of median SST at Tasmanian Seamounts.
- Figure 21.** The time series of median SST at Lord Howe Island.
- Figure 22.** The time series of median SST at Solitary Islands.
- Figure 23.** The time series of median SST at Elizabeth and Middleton Reef.
- Figure 24.** The time series of median SST at Lihou Reef.
- Figure 25.** The time series of median SST at Coringa-Herald.
- Figure 26.** The time series of median SSC at Ashmore Reef.
- Figure 27.** The time series of median SSC at Cartier Island.
- Figure 28.** The time series of median SSC at Mermaid Reef
- Figure 29.** The time series of median SSC at Ningaloo.
- Figure 30.** The time series of median SSC at Great Australian Bight.
- Figure 31.** The time series of median SSC at Tasmanian Seamounts.
- Figure 32.** The time series of median SSC at Macquarie Island.
- Figure 33.** The time series of median SSC at Lord Howe Island.
- Figure 34.** The time series of median SSC at Solitary Islands.
- Figure 35.** The time series of median SSC at Elizabeth and Middleton Reef.

Figure 36. The time series of median SSC at Lihou Reef.

Figure 37. The time series of median SSC at Coringa-Herald.

Figure 38. SST habitat areas by month for Ashmore Reef.

Figure 39. SST habitat areas by month for Cartier Island.

Figure 40. SST habitat areas by month for Mermaid Reef.

Figure 41. SST habitat areas by month for Ningaloo.

Figure 42. SST habitat areas by month for Great Australian Bight.

Figure 43. SST habitat areas by month for Tasmanian Seamounts.

Figure 44. SST habitat areas by month for Lord Howe Island.

Figure 45. SST habitat areas by month for Solitary Islands.

Figure 46. SST habitat areas by month for Elizabeth and Middleton Reefs.

Figure 47. SST habitat areas by month for Lihou Reef.

Figure 48. SST habitat areas by month for Coringa-Herald.

Figure 49. SSC habitat areas by month for Ashmore Reef.

Figure 50. SSC habitat areas by month for Cartier Island.

Figure 51. SSC habitat areas by month for Mermaid Reef.

Figure 52. SSC habitat areas by month for Ningaloo.

Figure 53. SSC habitat areas by month for Great Australian Bight.

Figure 54. SSC habitat areas by month for Tasmanian Seamounts.

Figure 55. SSC habitat areas by month for Macquarie Island.

Figure 56. SSC habitat areas by month for Lord Howe Island.

Figure 57. SSC habitat areas by month for Solitary Islands.

Figure 58. SSC habitat areas by month for Elizabeth and Middleton Reefs.

Figure 59. SSC habitat areas by month for Lihou Reef.

Figure 60. SSC habitat areas by month for Coringa-Herald. .

Figure 61. SST habitat areas by month for the MPAs.

Figure 62. SSC habitat areas by month for the MPAs.

Figure 63. Frequency of SST habitats for each MPA

Figure 64. Frequency of SSC habitats for each MPA.

Figure 65. SST habitat area values by month, for all years 1991-1999.

Figure 66. SSC habitat area values by month, for all years 1991-1999.

Figure 67. SST habitat areas, cumulative frequency of monthly values.

Figure 68. SSC habitat areas, cumulative frequency of monthly values.

Figure 69. Fraction of the SST habitat area that is covered by the MPA by month.

Figure 70. Fraction of the SSC habitat area that is covered by the MPA by month.

Figure 71. Maximum and mean SST habitat zones for all months and all MPAs.

Figure 72. Maximum and mean SST habitat zones by month for all MPAs.

Figure 73. Maximum and mean SSC habitat zones for all months and all MPAs.

Figure 74. Maximum and mean SSC habitat zones by month for all MPAs.

Figure 75. Relationship between the mean size of the habitat areas found for each MPA using the SST and SSC definitions each month.

Figure 76. Relationship between the maximum size of the habitat areas found for each MPA using the SST and SSC definitions each month.

Figure 77. Relationship between the maximum size of the habitat areas found for each MPA using the SST and SSC definitions.

Figure 78. Relationship between monthly SST and SSC values for the habitat area.

Figure 79. Relationship between monthly SST values for the habitat area and the size of the SST habitat area.

Figure 80. Relationship between monthly SSC values for the habitat area and the size of the SSC habitat area.

10. Table List

Table 1. Average percentage of the SST and SSC monthly habitat area (defined for each MPA) that is covered by that MPA.

Table 2. Mean SST Habitat Area climatology.

Table 3. Mean SSC Habitat Area climatology.

Figure 1. The center of the twelve Commonwealth MPAs considered in this study. The Australian EEZ is shown.

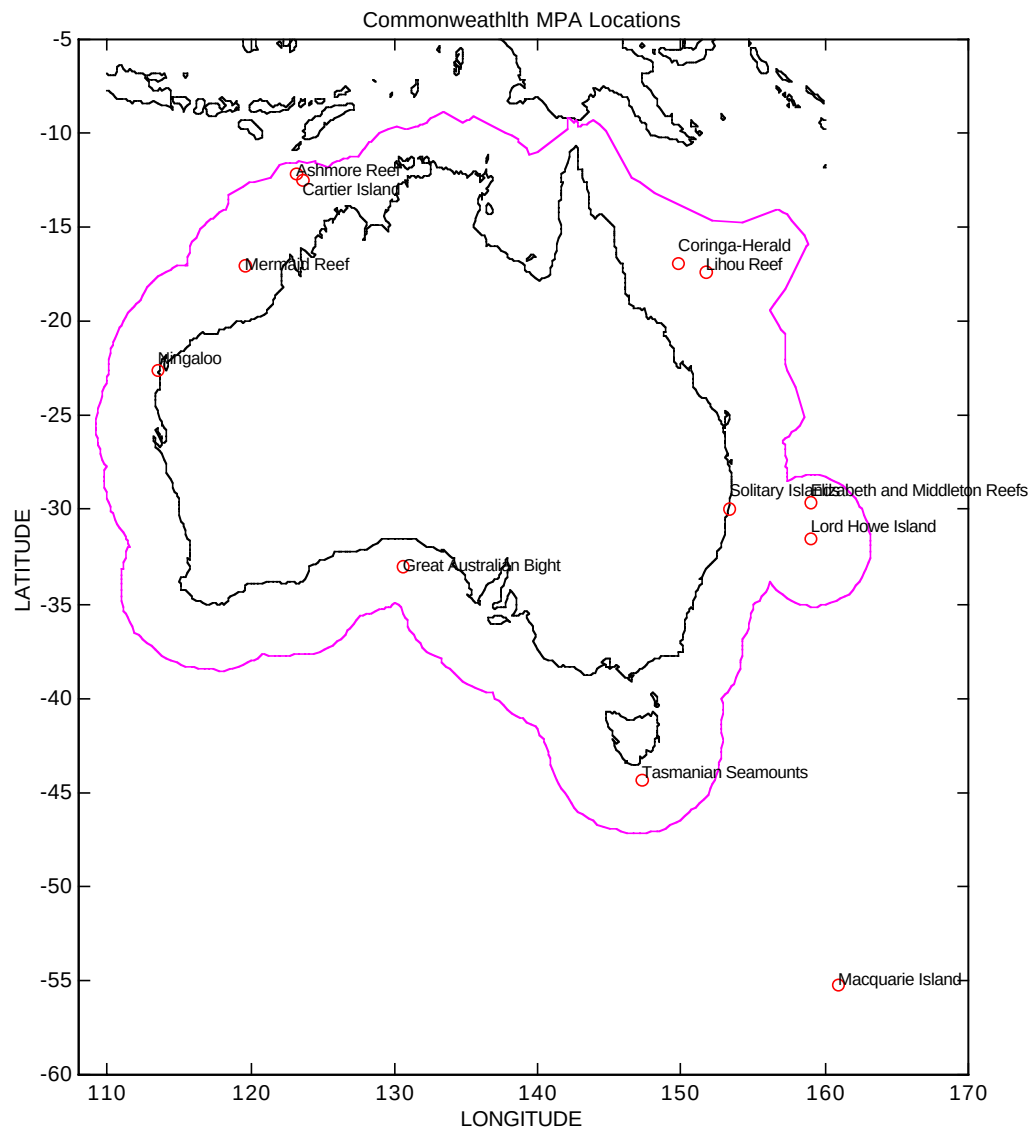


Figure 2. The boundary and location of the twelve Australian Commonwealth MPA's. Each star represents a pixel that was sampled for SST for each satellite date. The number of pixels sampled is provided above each panel. SST data was not available for Macquarie Island.

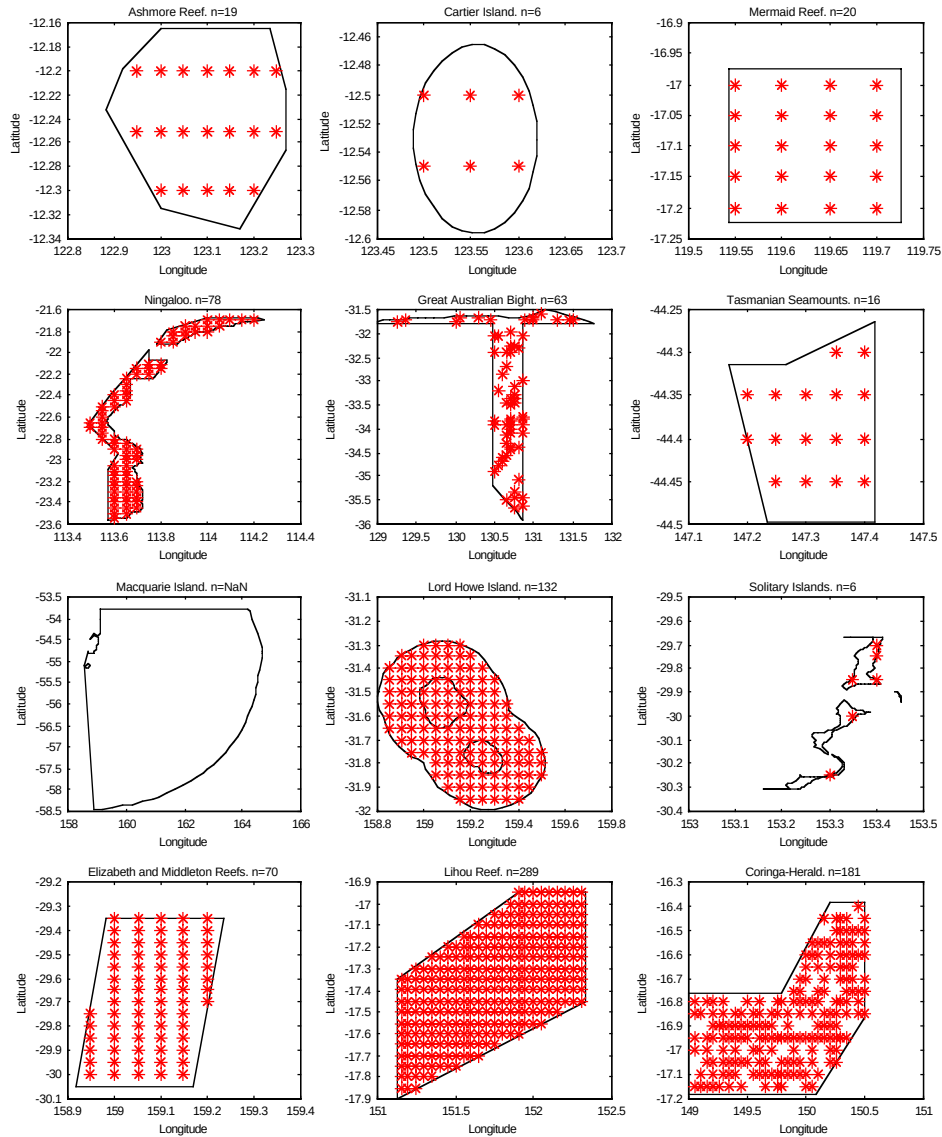


Figure 3. Examples of SST (upper panel) and SSC (lower panel) images from which data for the MPAs was extracted. Note the log scale of the SSC data.

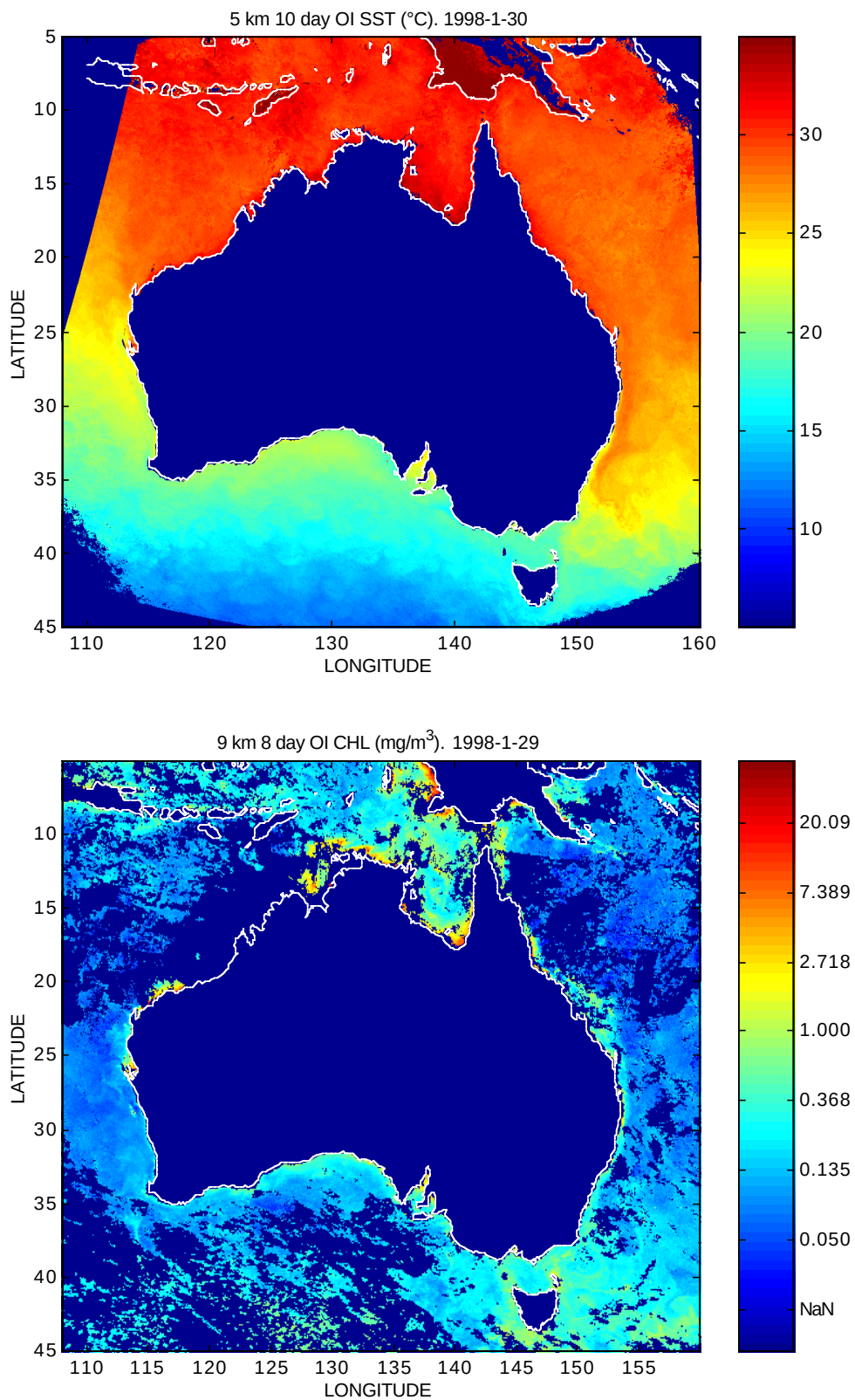


Figure 4. Transects used to determine the boundary of the SST and SSC habitats for each MPA. The eight transects around each MPA are numbered. Each transect extends 500 km from the MPA center.

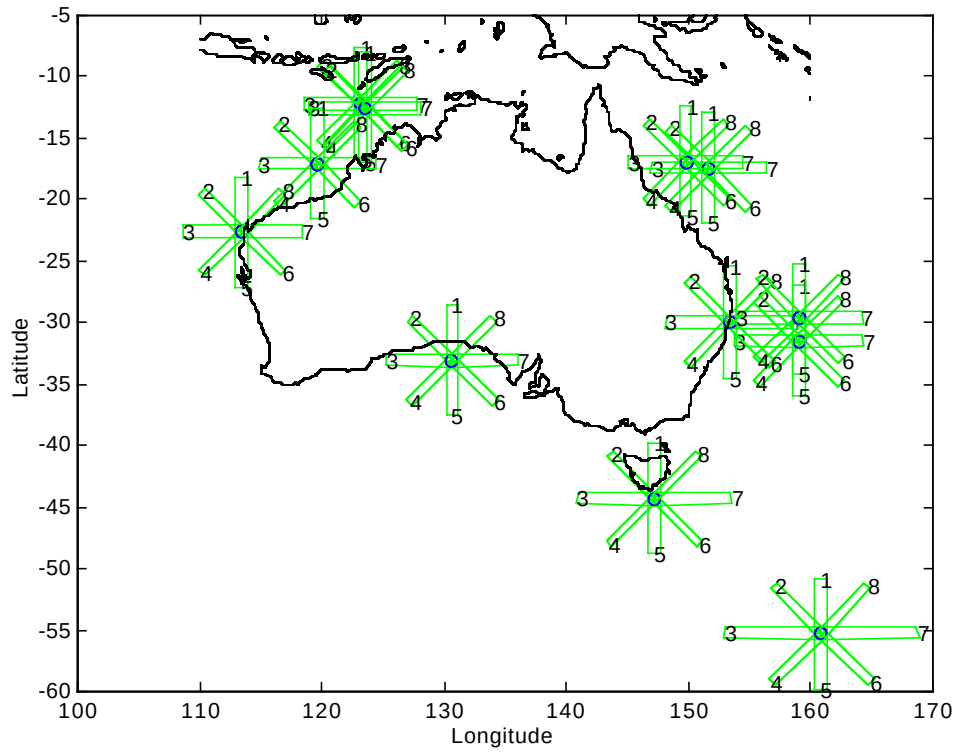


Figure 5. Examples of SST habitat edge detection. The edge was defined as the first distance at which the median temperature was $\pm 2.5\%$ (solid lines) of the value at the center of the MPA (dotted line).

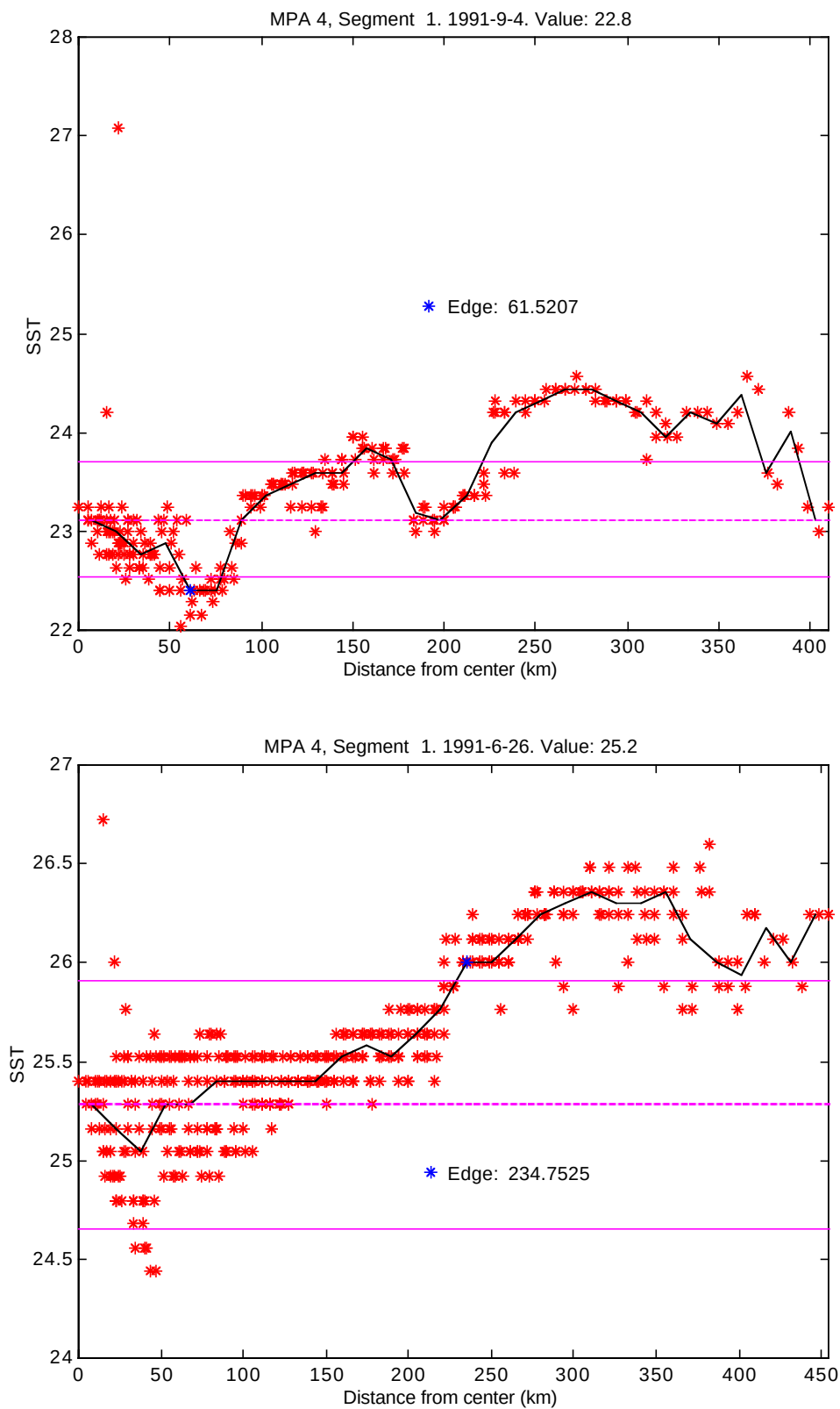


Figure 6. Relationship between the size of each MPA and the number of SST pixels that were sampled each date to provide the data. The panel on the right is the expanded lower-left portion of the right hand panel. MPA numbers refer to: 1. Ashmore Reef. 2. Cartier Island. 3. Mermaid Reef. 4. Ningaloo. 5. Great Australian Bight. 6. Tasmanian Seamounts. 7. Macquarie Island. 8. Lord Howe Island. 9. Solitary Islands. 10. Elizabeth and Middleton Reefs. 11. Lihou Reef. 12. Coringa-Herald.

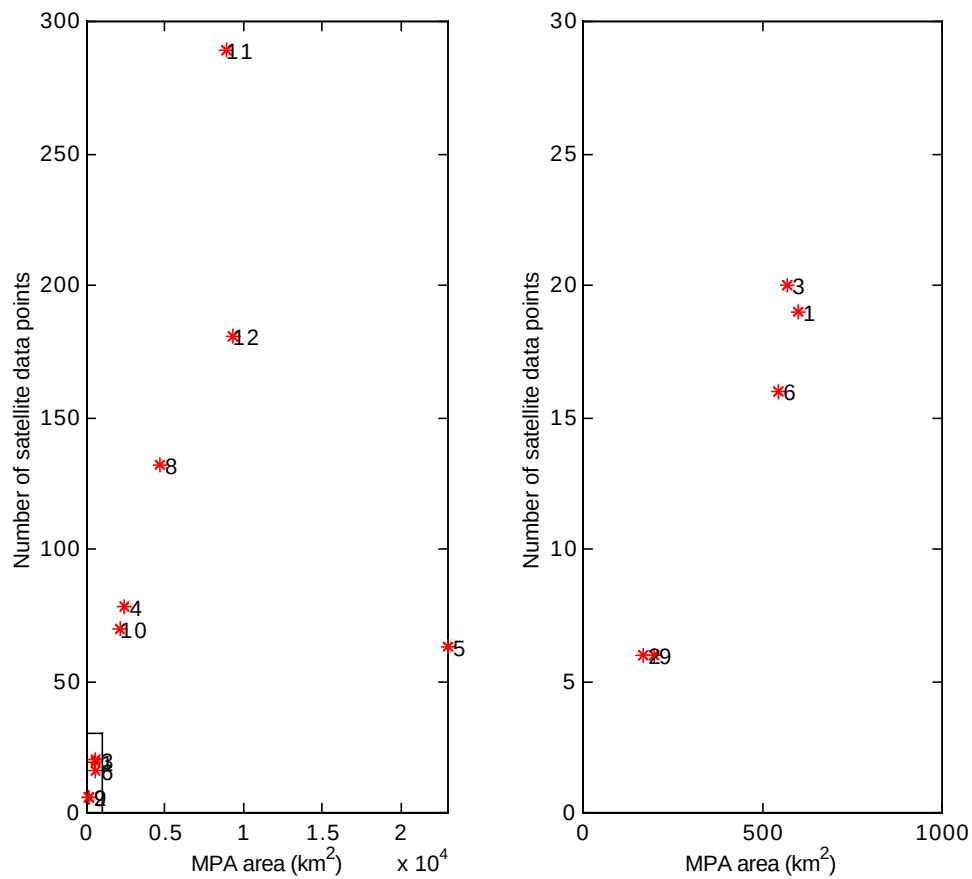


Figure 7. Number of pixels sampled for each date to produce the SST data for each MPA displayed by day of the year. The variation in the number sampled for Great Australian Bight and Coringa-herald MPAs is explained in the text.

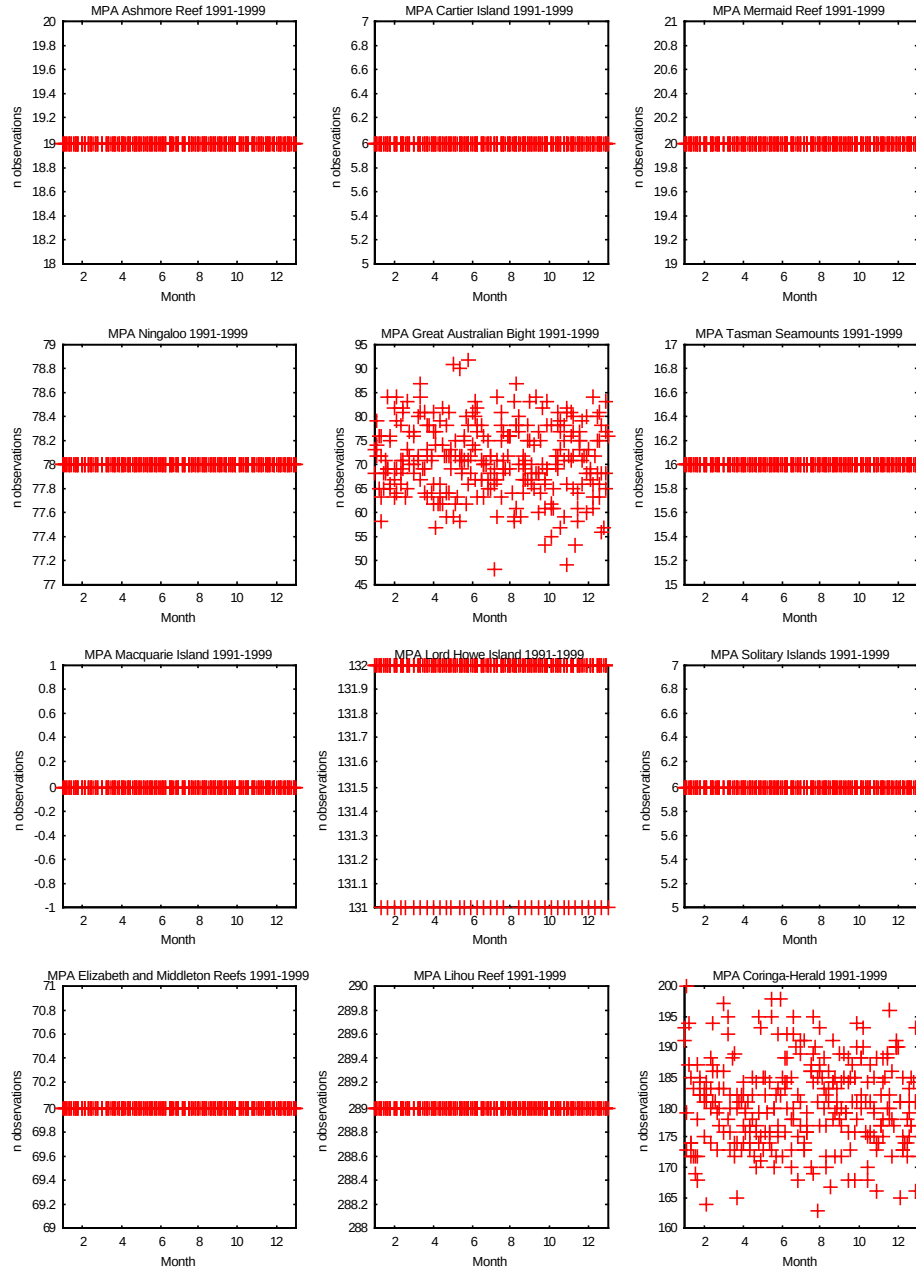


Figure 8. Number of pixels sampled for each date to produce the SSC data for each MPA, displayed by day of the year. Where the number of pixels is zero, there was no data for that MPA for that date. The number sampled varies due to cloud contamination in the iamges.

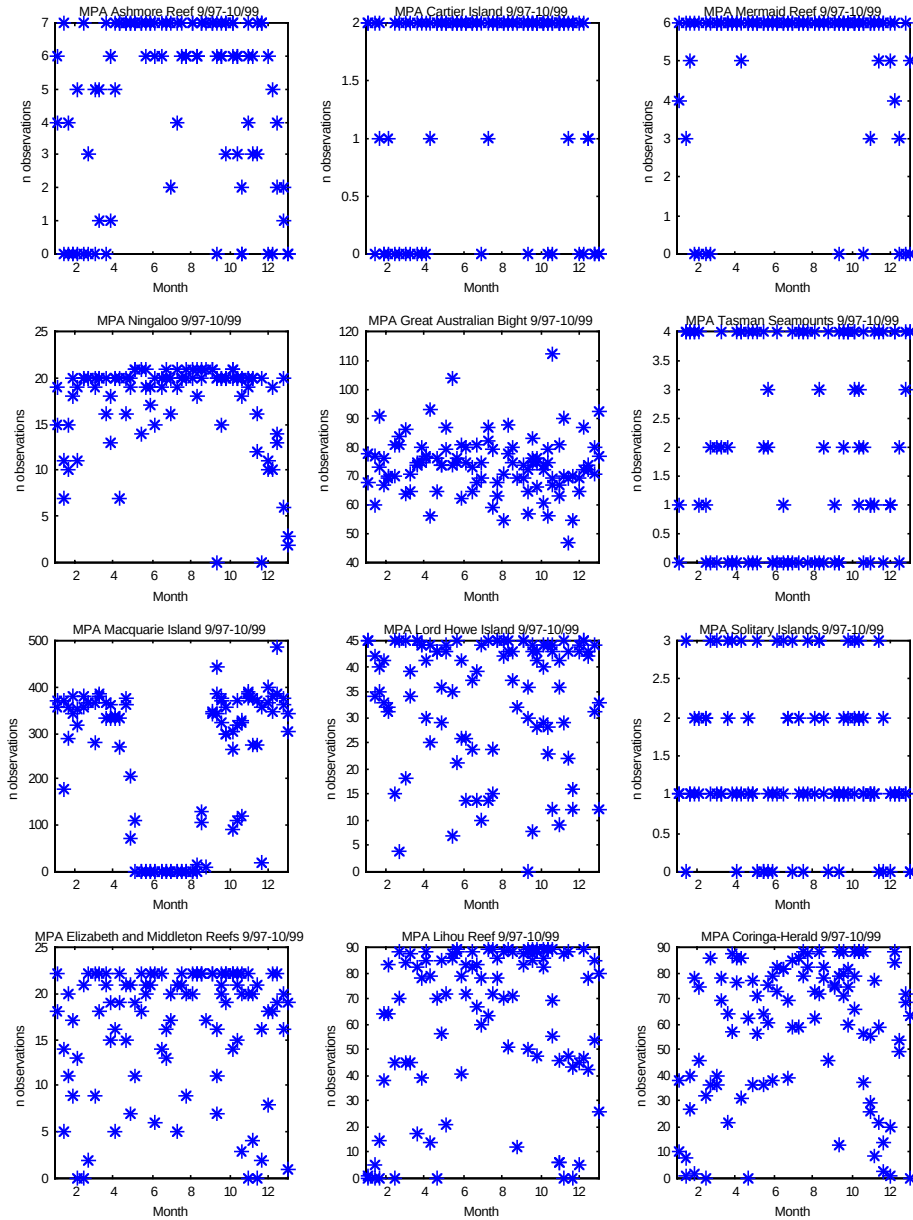


Figure 9. SST climatology for the period 1991-1999 at the twelve Commonwealth MPA's. The dotted line is $\pm 2SD$. SST for Macquarie Island was not available.

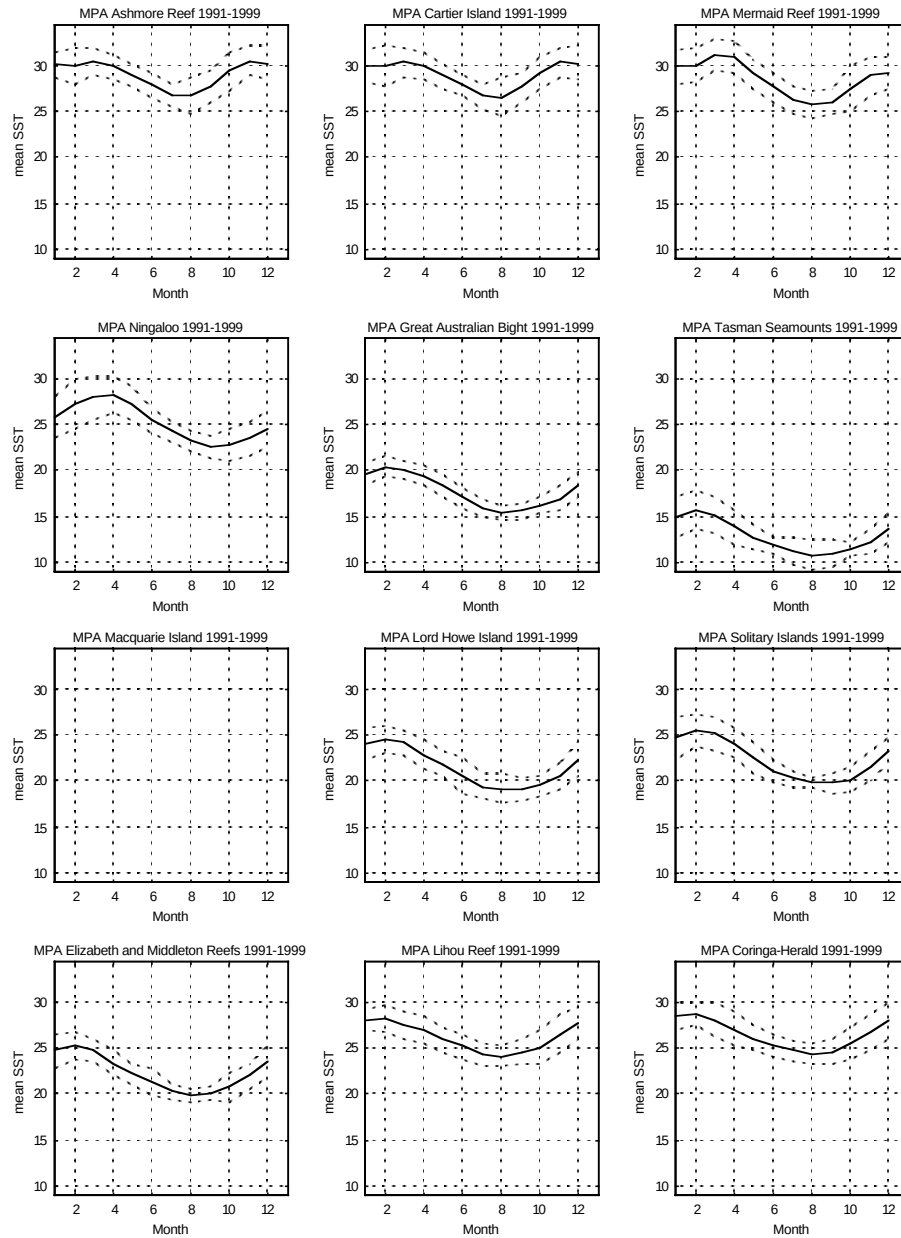


Figure 10. SSC climatology for the period 1997-1999 at the twelve Commonwealth MPA's. The dotted line is $\pm 2SD$. Note the log scale for the y-axis.

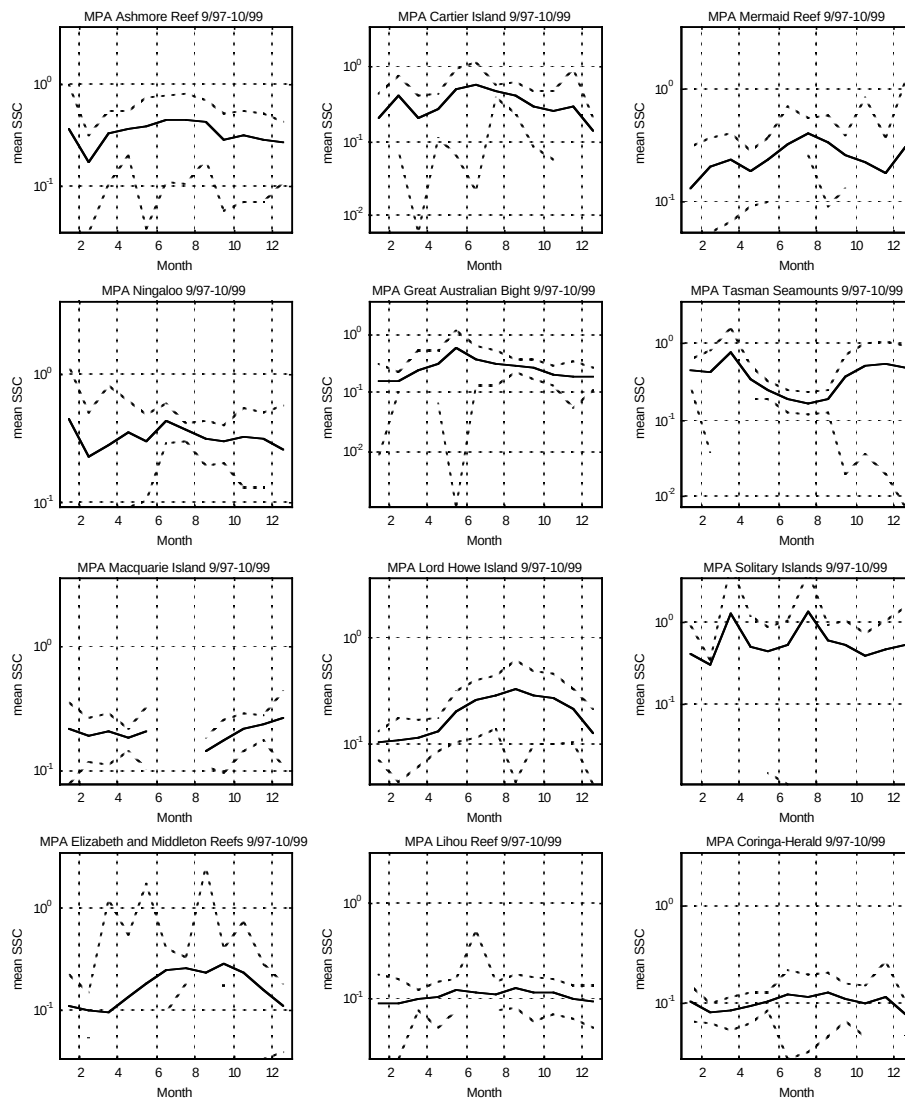


Figure 11. SST medians for each MPA by day of the year, together with the climatology (solid line) and $\pm 2SD$ (dashed line). SST for Macquarie Island was not available.

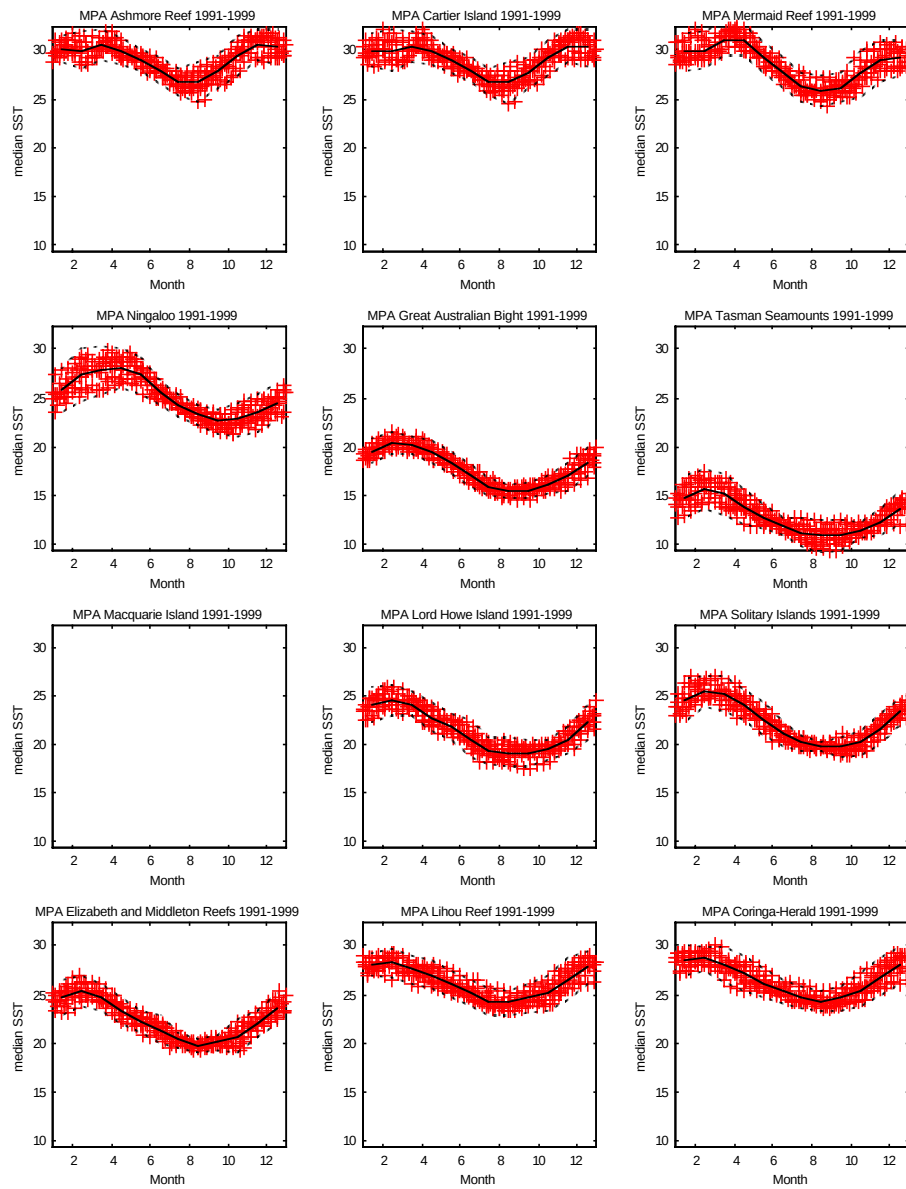


Figure 12. SSC medians for each MPA by day of the year, together with the climatology (solid line) and $\pm 2SD$ (dashed line). Note the log scale for the y-axis.

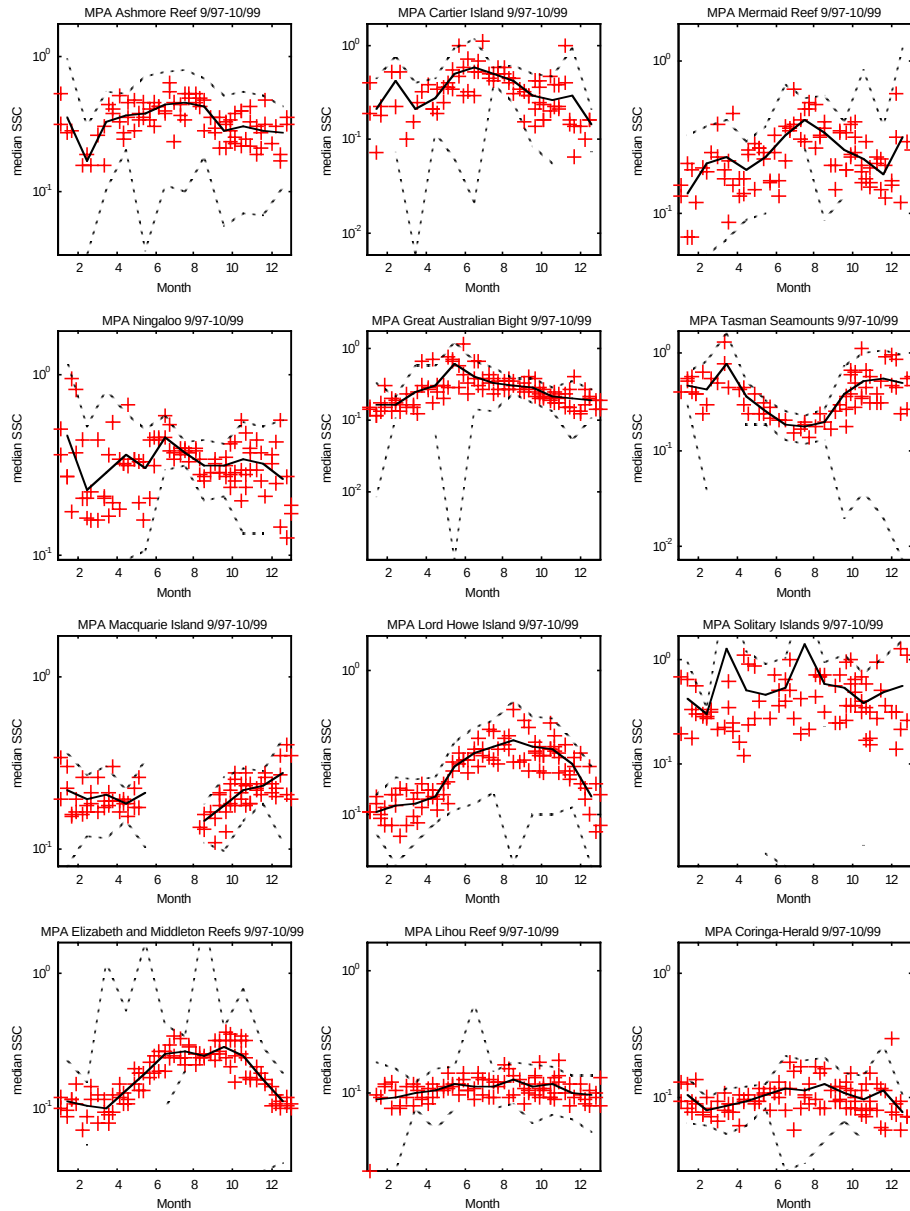


Figure 13. Maximum and minimum SST values in each MPA for each date by day of the year. The climatology (solid line) from the median values is shown (dashed line is $\pm 2SD$).

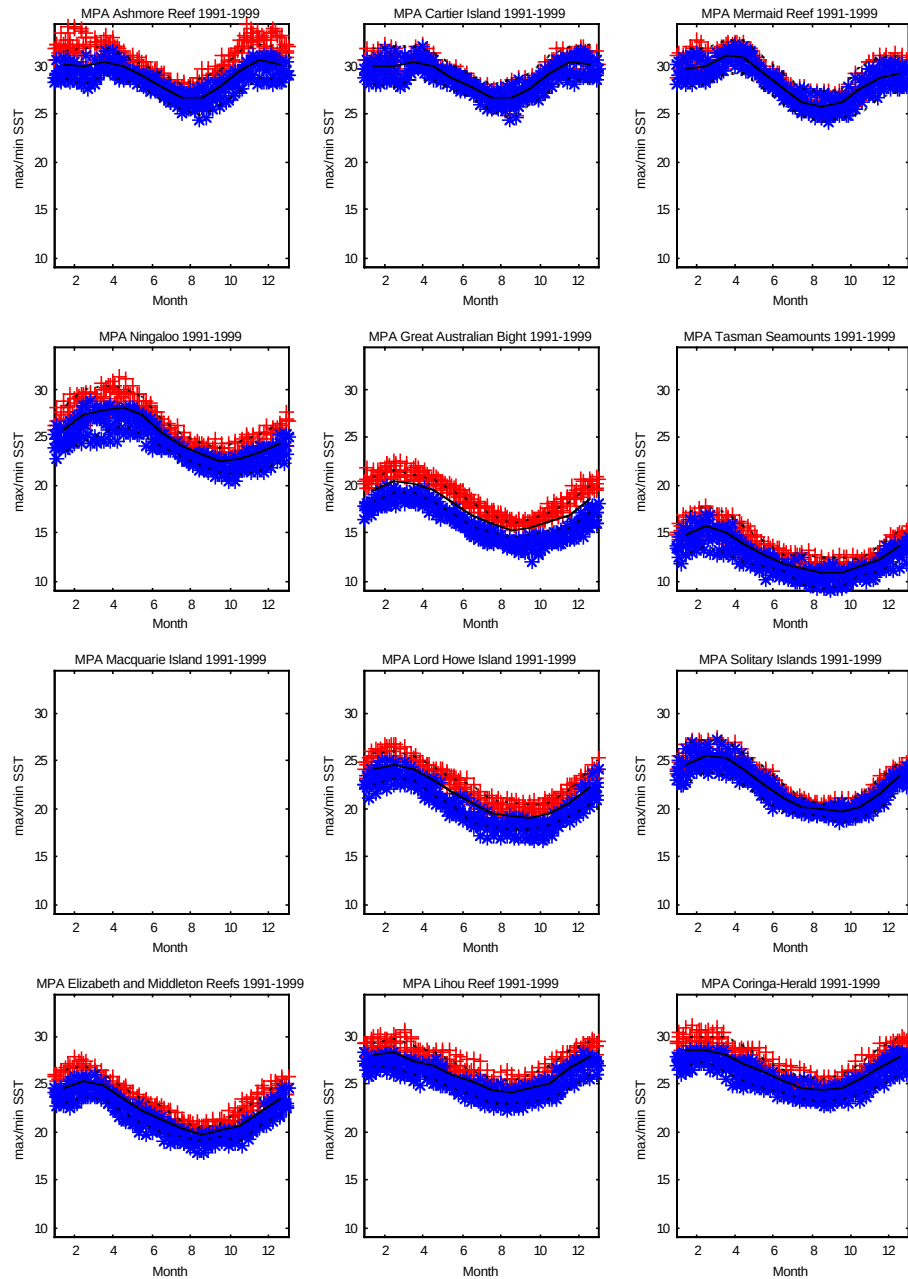


Figure 14. Maximum and minimum SSC values in each MPA for each date by day of the year. The climatology (solid line) from the median values is shown (dashed line is $\pm 2SD$). Note the log scale for the y-axis.

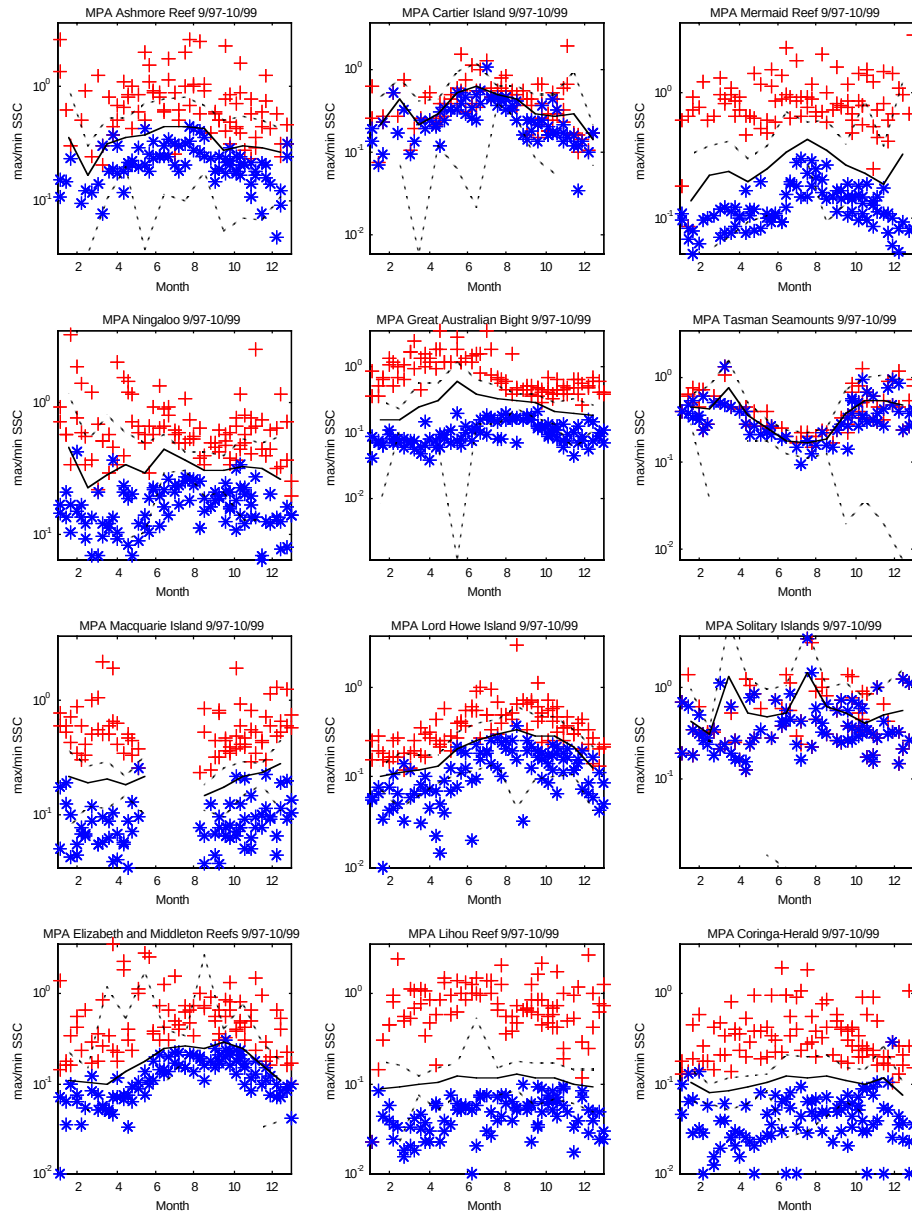


Figure 15. The time series of median SST at Ashmore Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

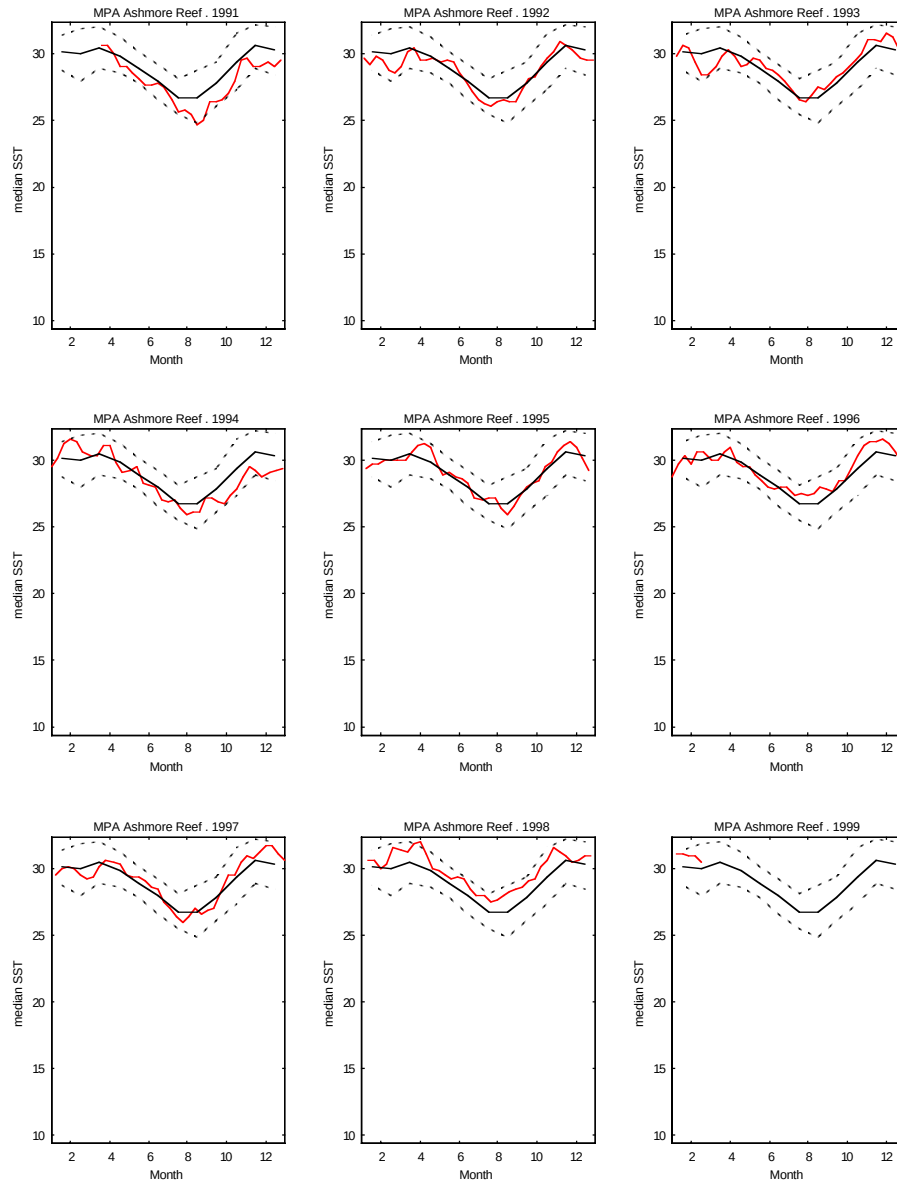


Figure 16. The time series of median SST at Cartier Island by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

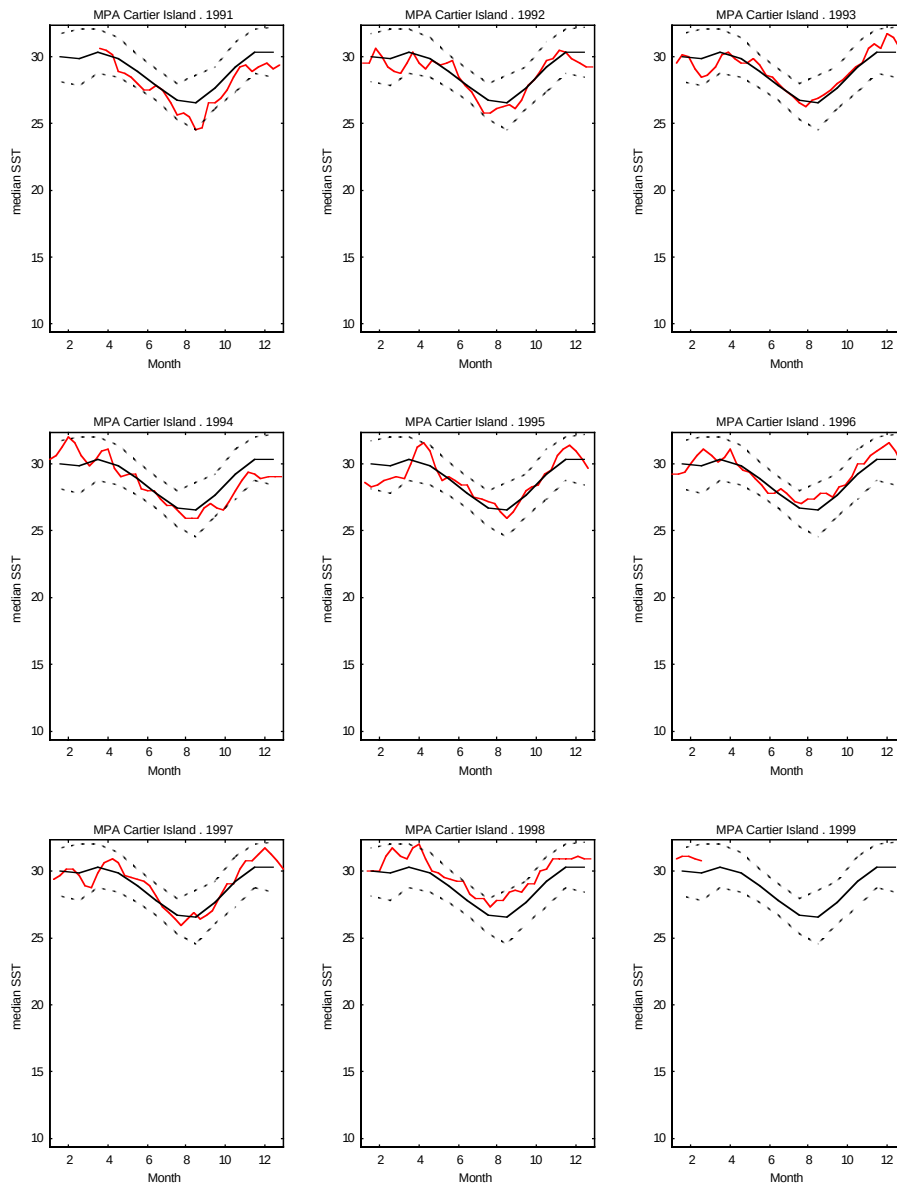


Figure 17. The time series of median SST at Mermaid Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

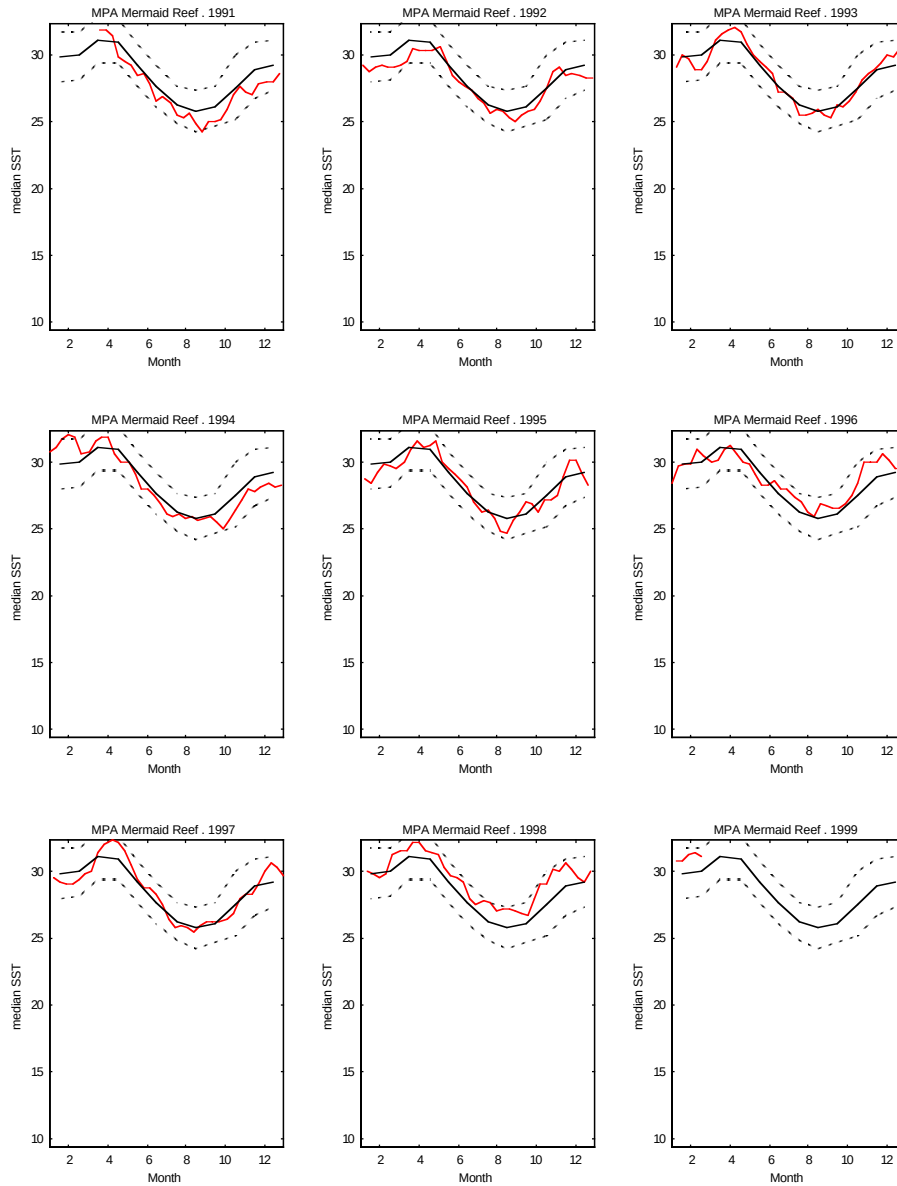


Figure 18. The time series of median SST at Ningaloo by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

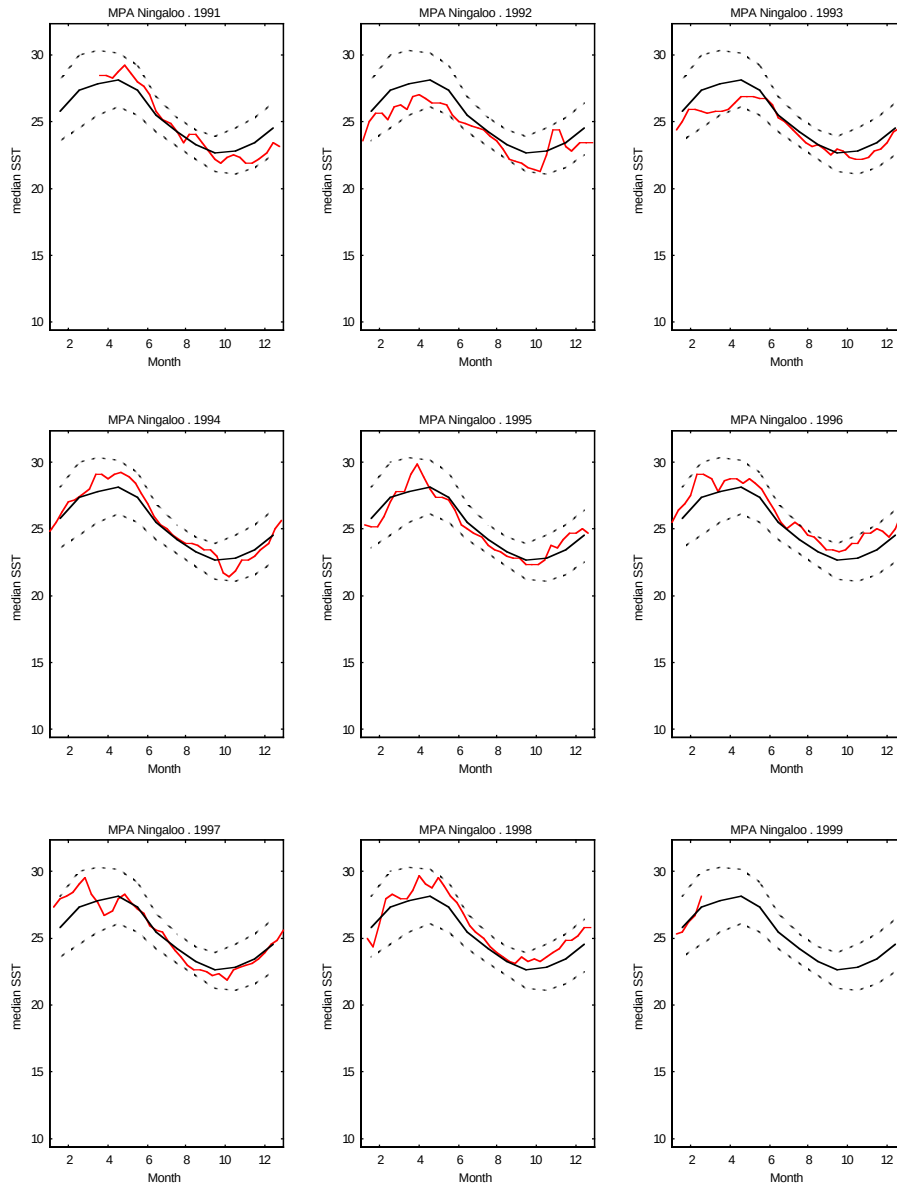


Figure 19. The time series of median SST at Great Australian Bight by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

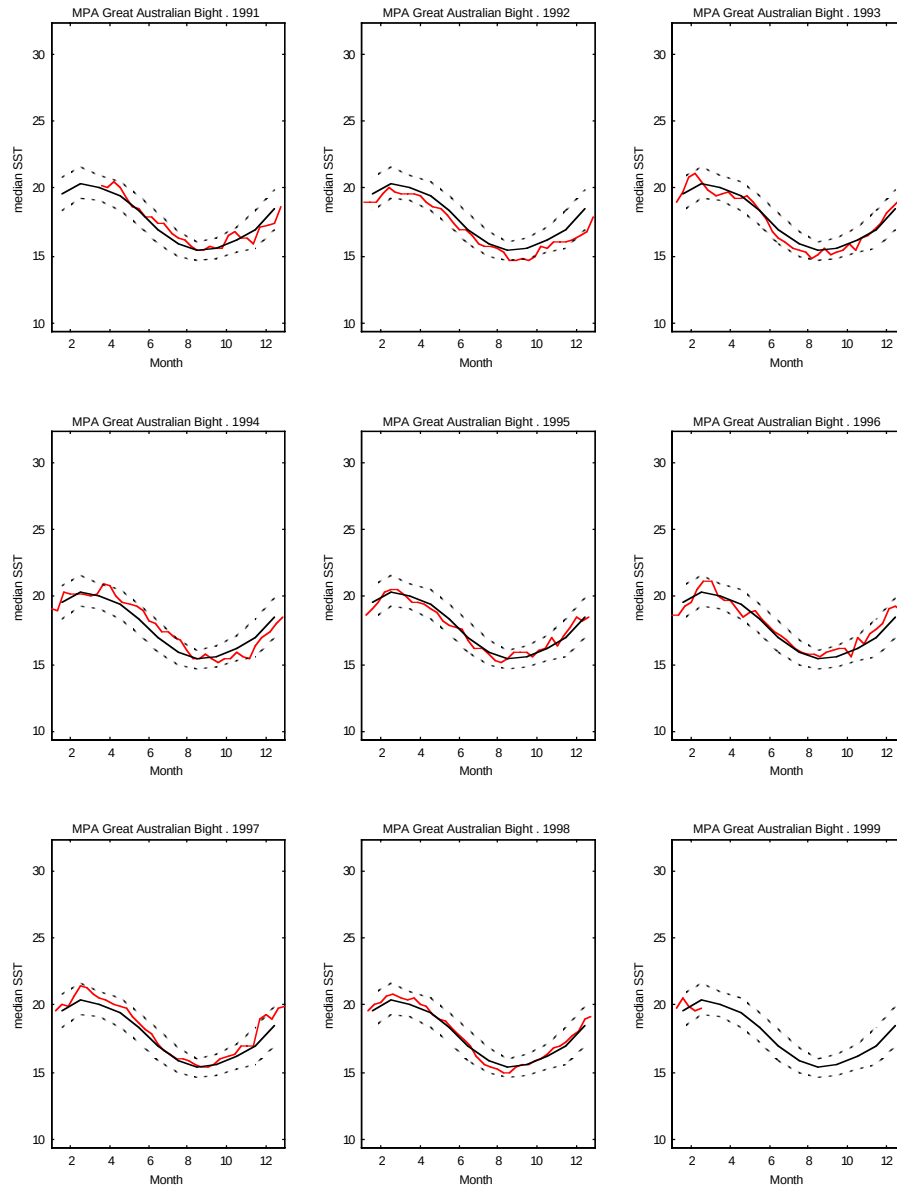


Figure 20. The time series of median SST at Tasmanian Seamounts by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

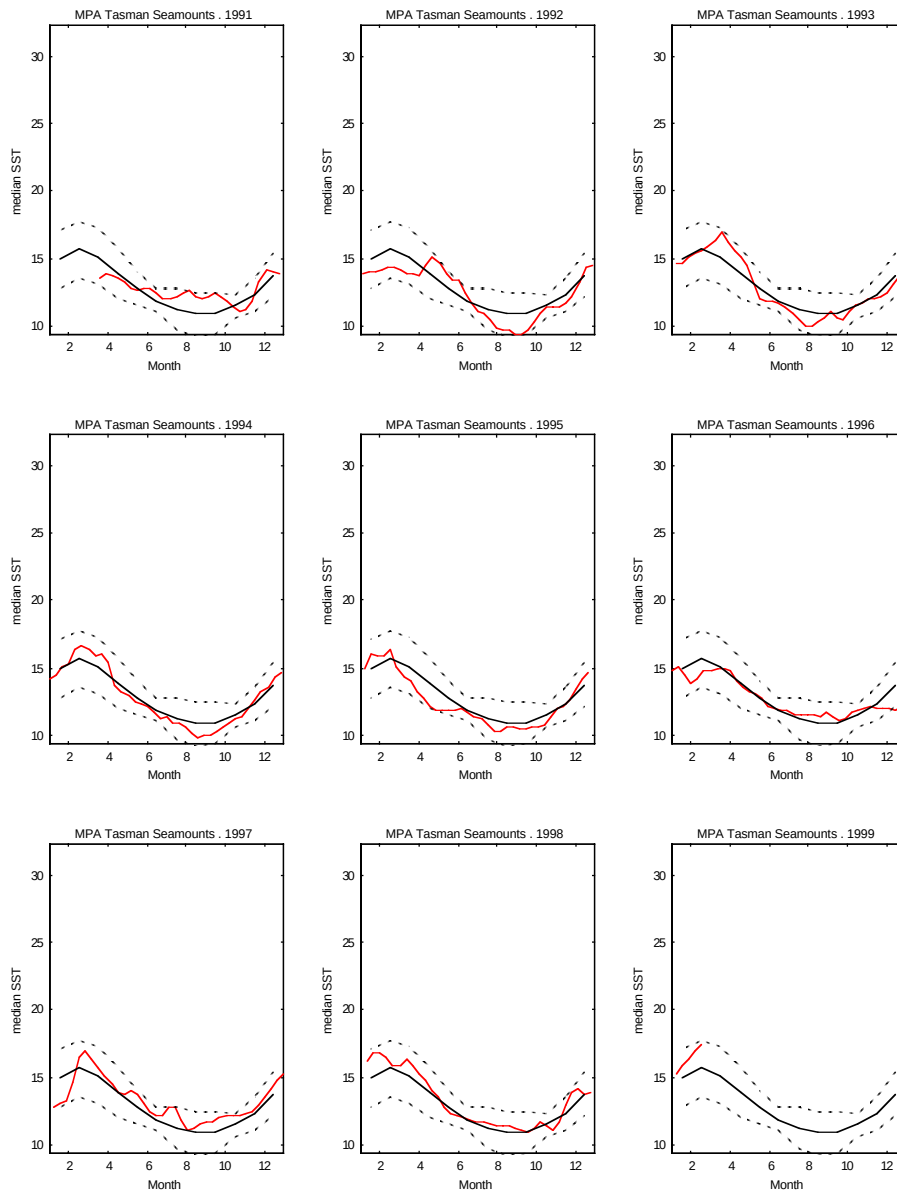


Figure 21. The time series of median SST at Lord Howe Island by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

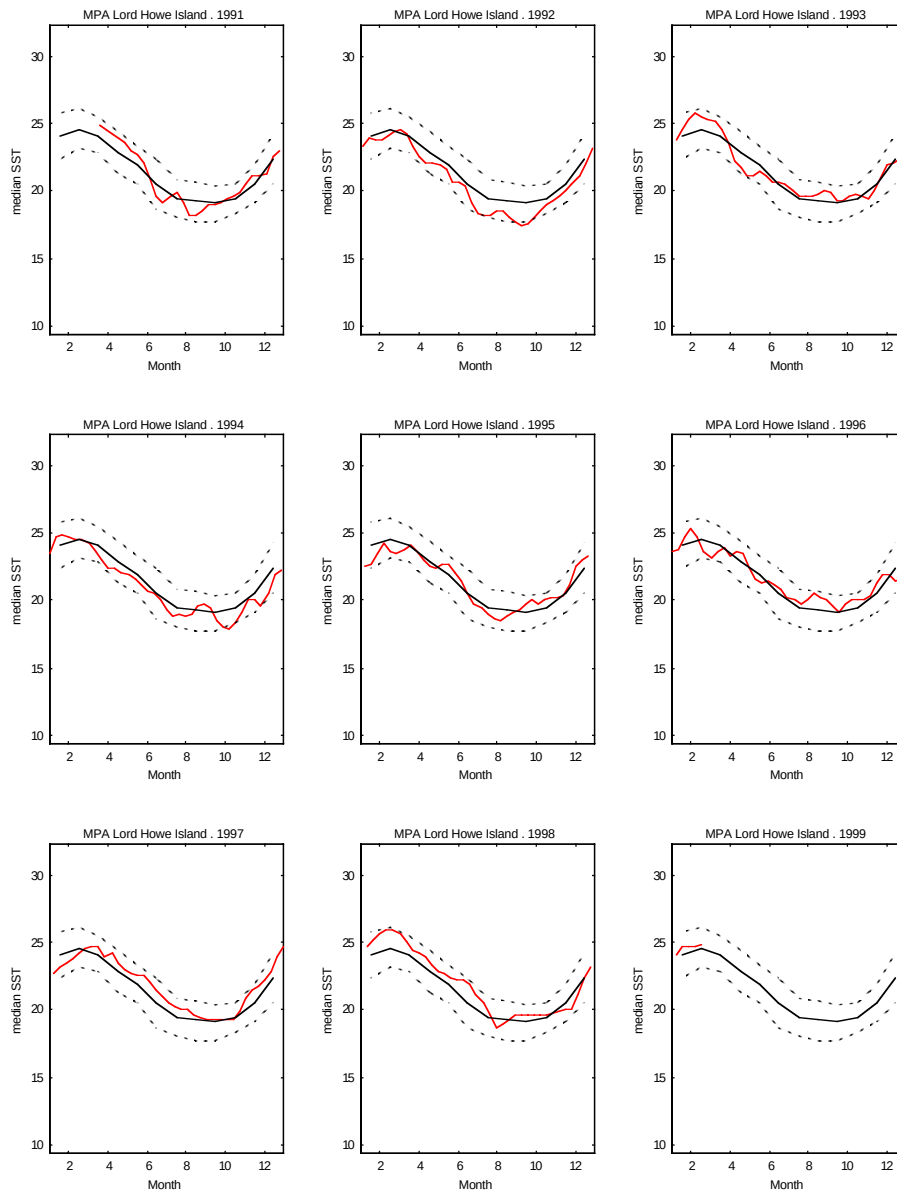


Figure 22. The time series of median SST at Solitary Islands by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

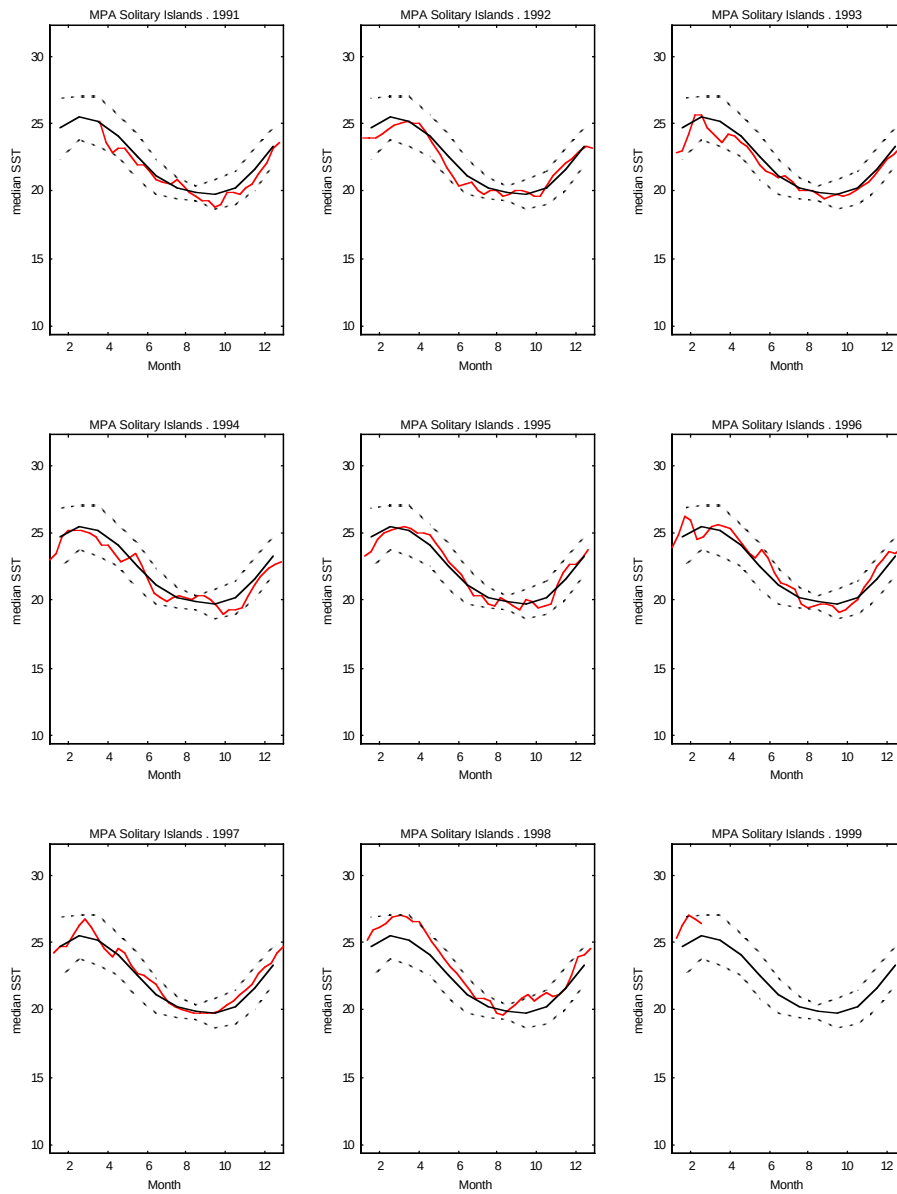


Figure 23. The time series of median SST at Elizabeth and Middleton Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

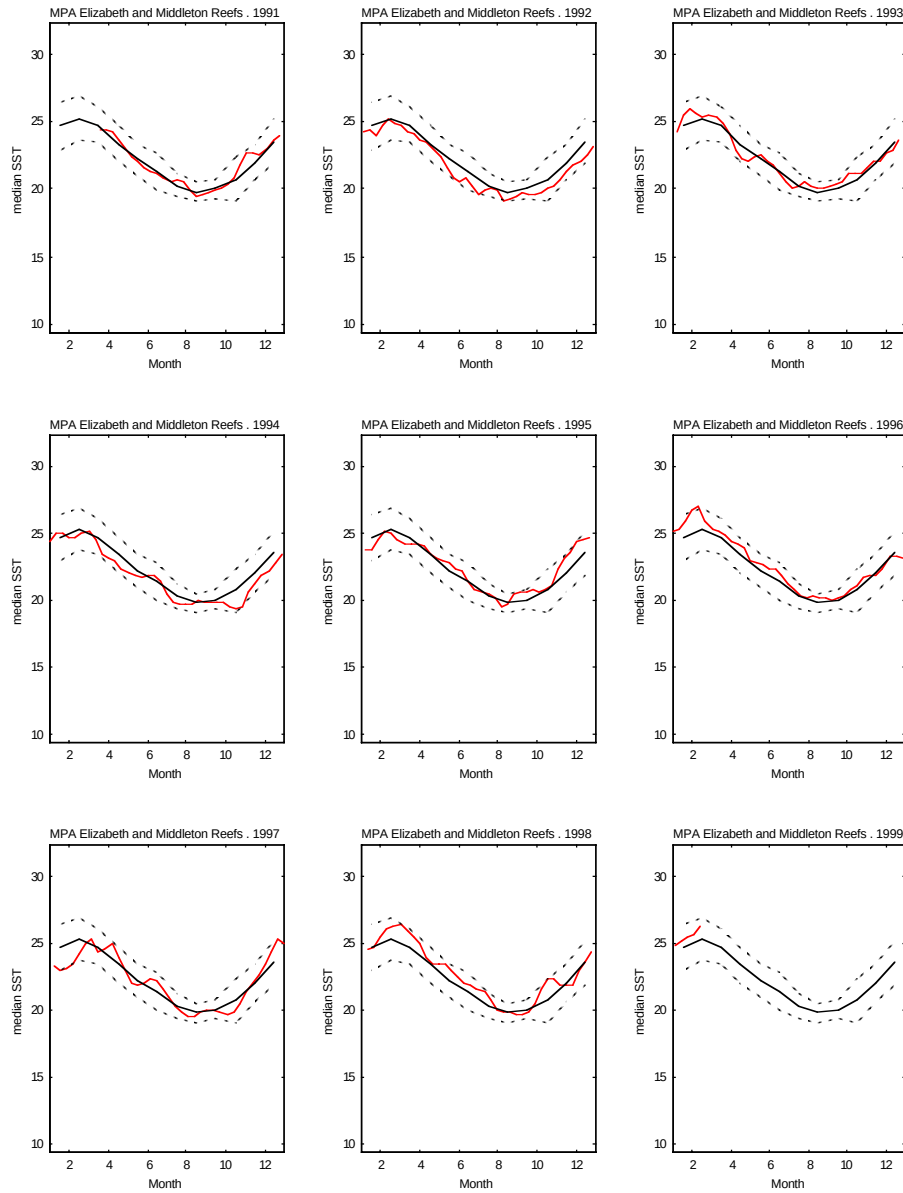


Figure 24. The time series of median SST at Lihou Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

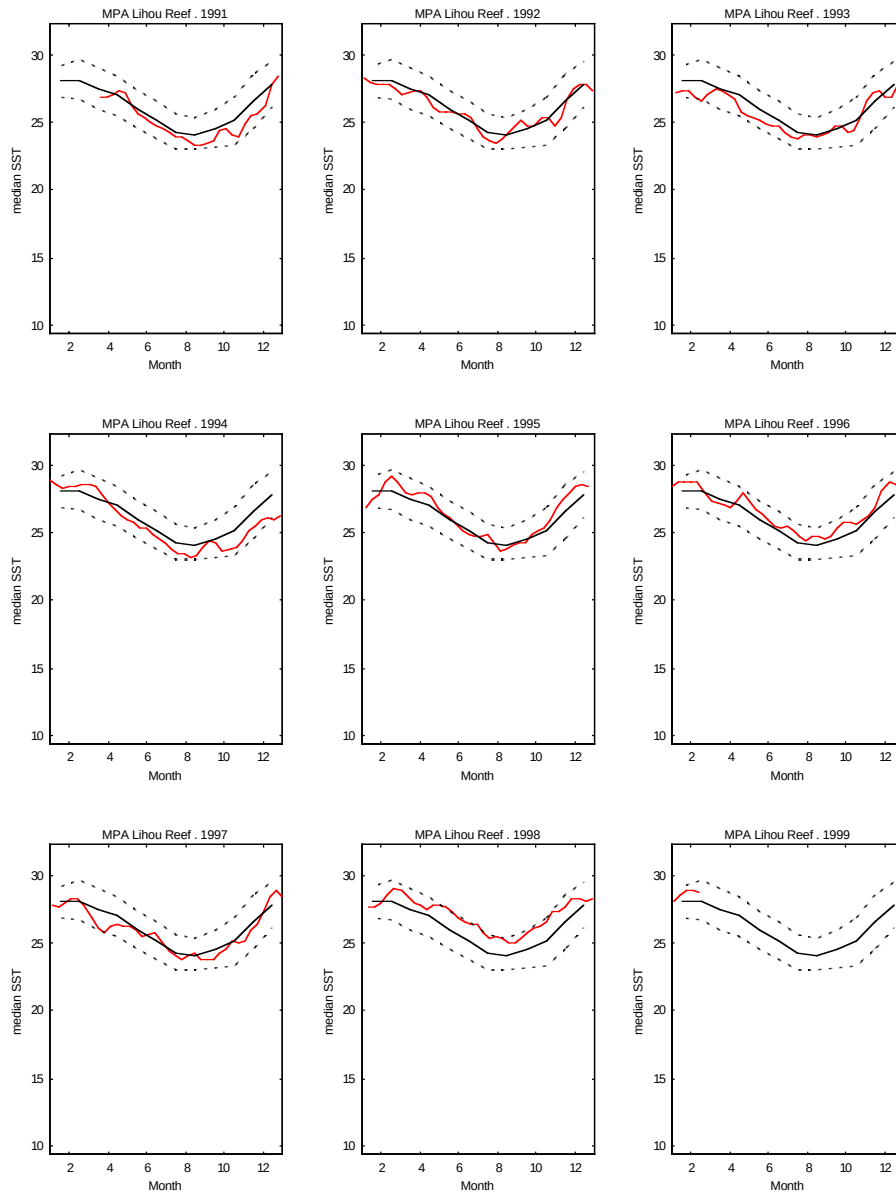


Figure 25. The time series of median SST at Coringa-Herald by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1991-1999.

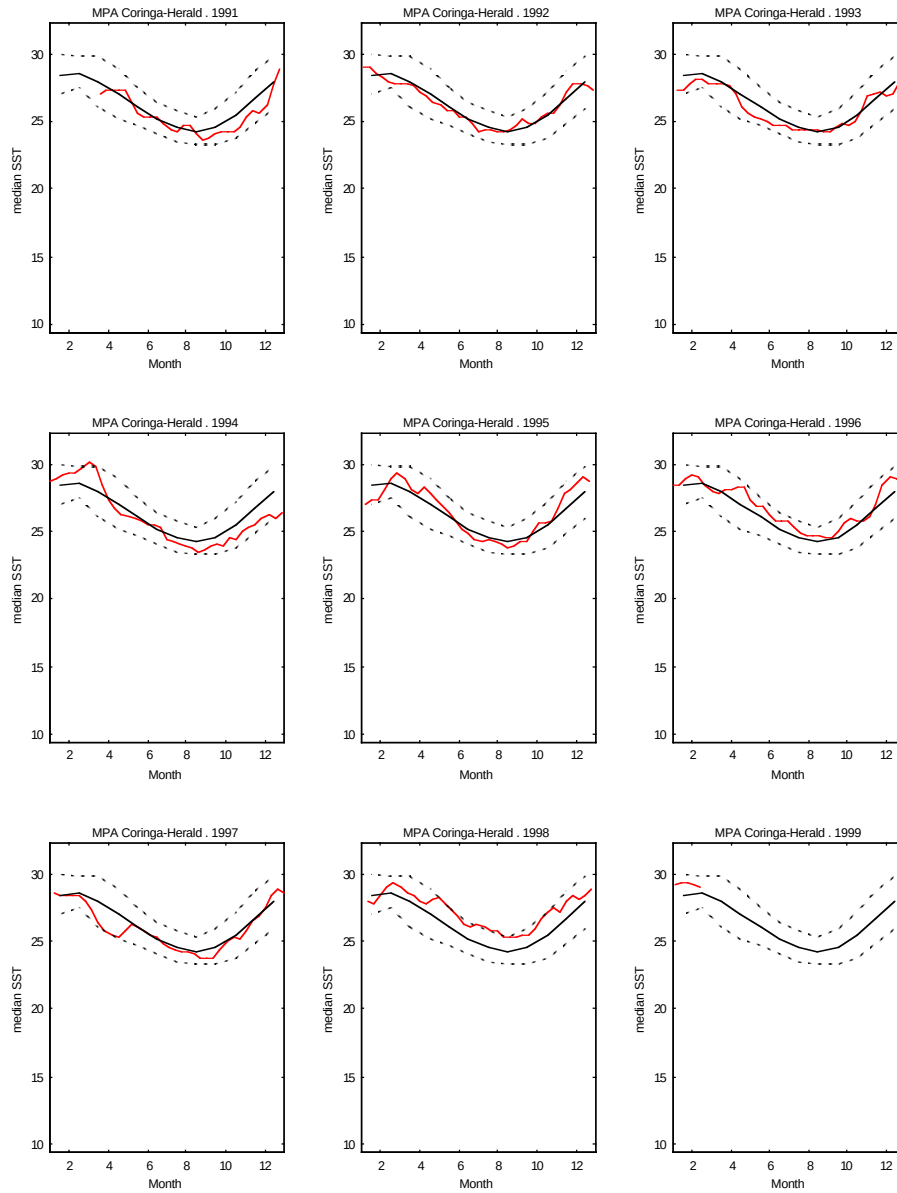


Figure 26. The time series of median SSC at Ashmore Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

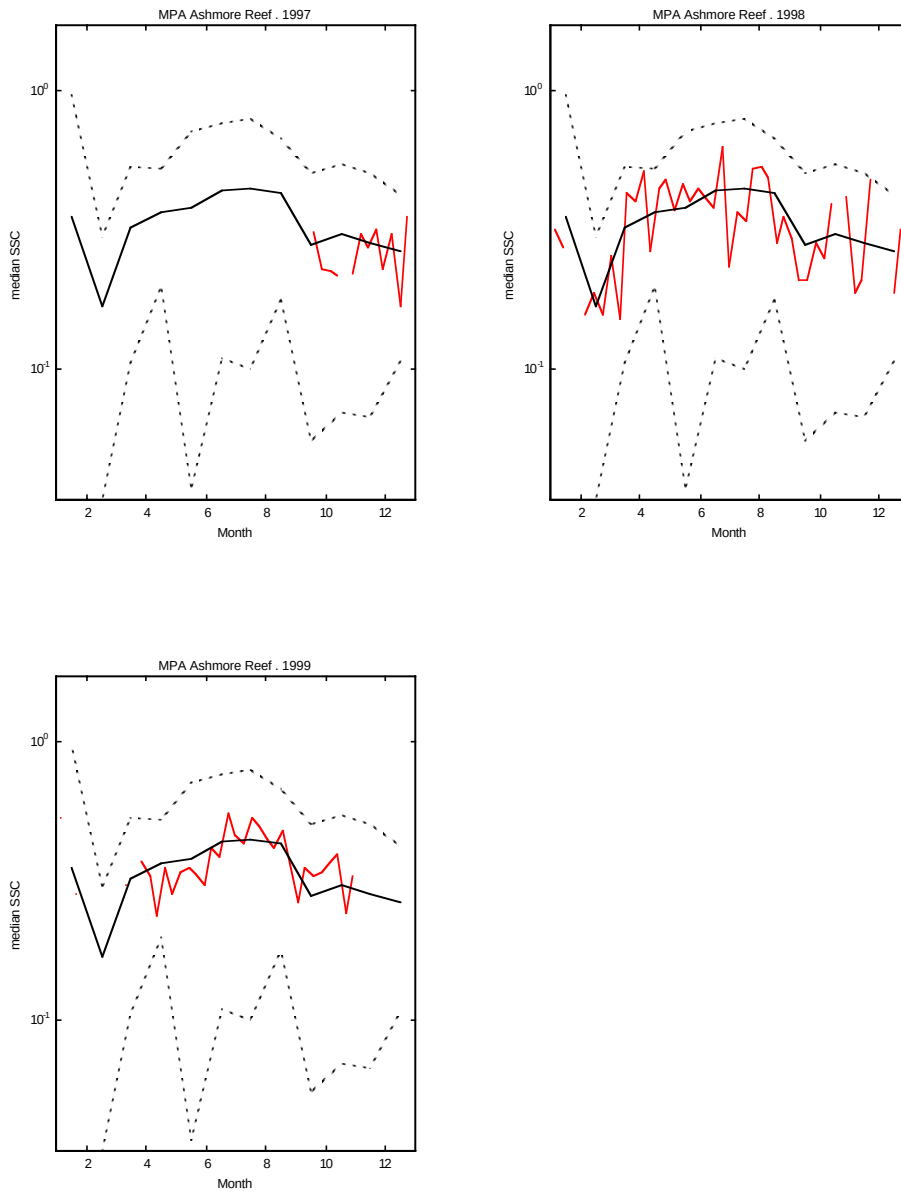


Figure 27. The time series of median SSC at Cartier Island by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

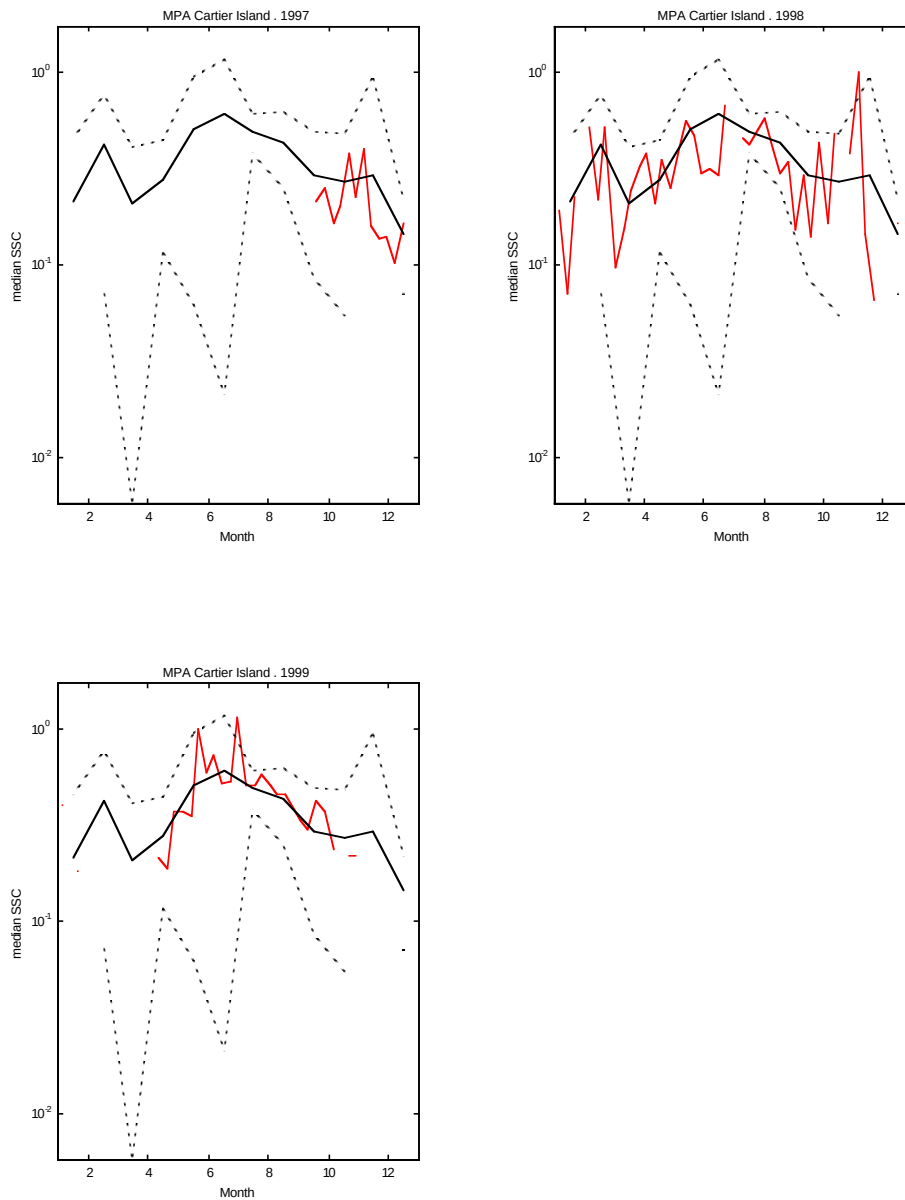


Figure 28. The time series of median SSC at Mermaid Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

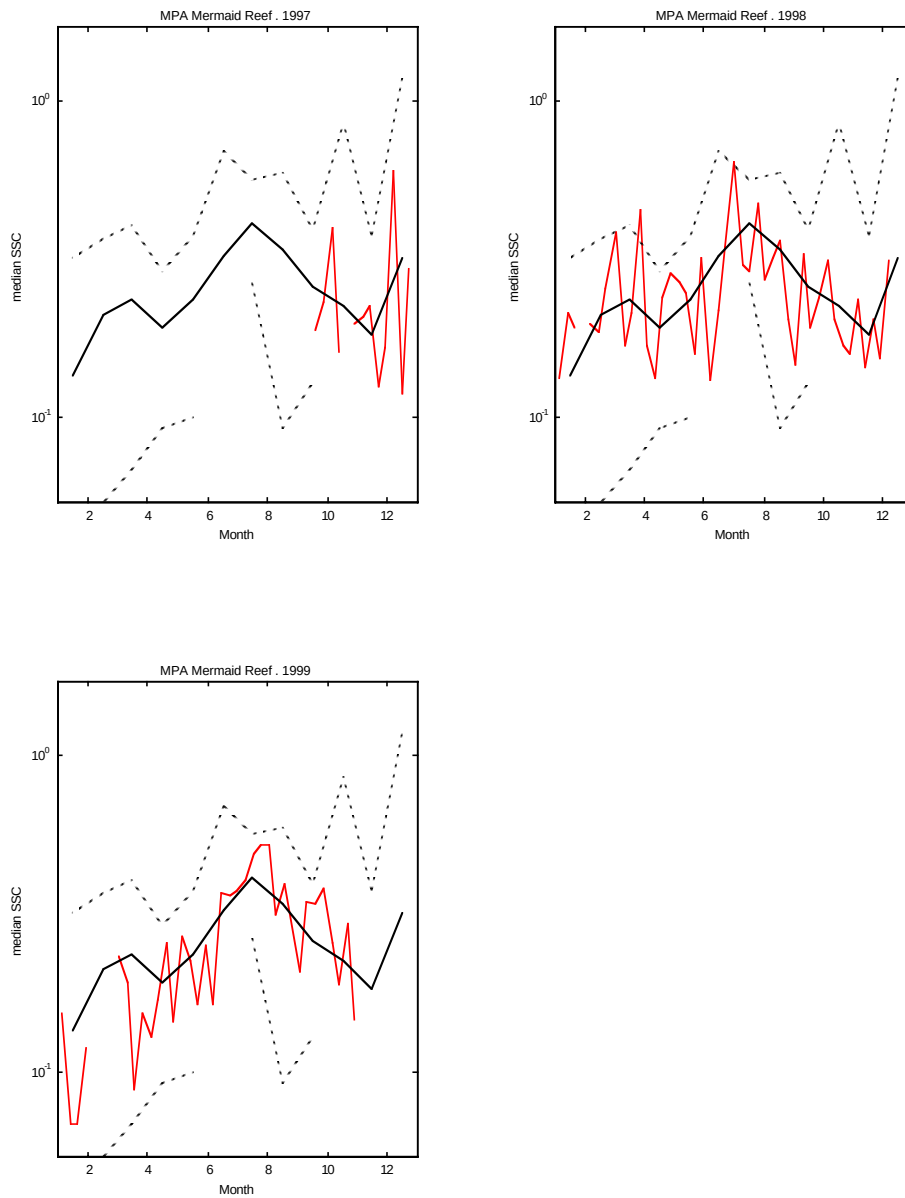


Figure 29. The time series of median SSC at Ningaloo by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

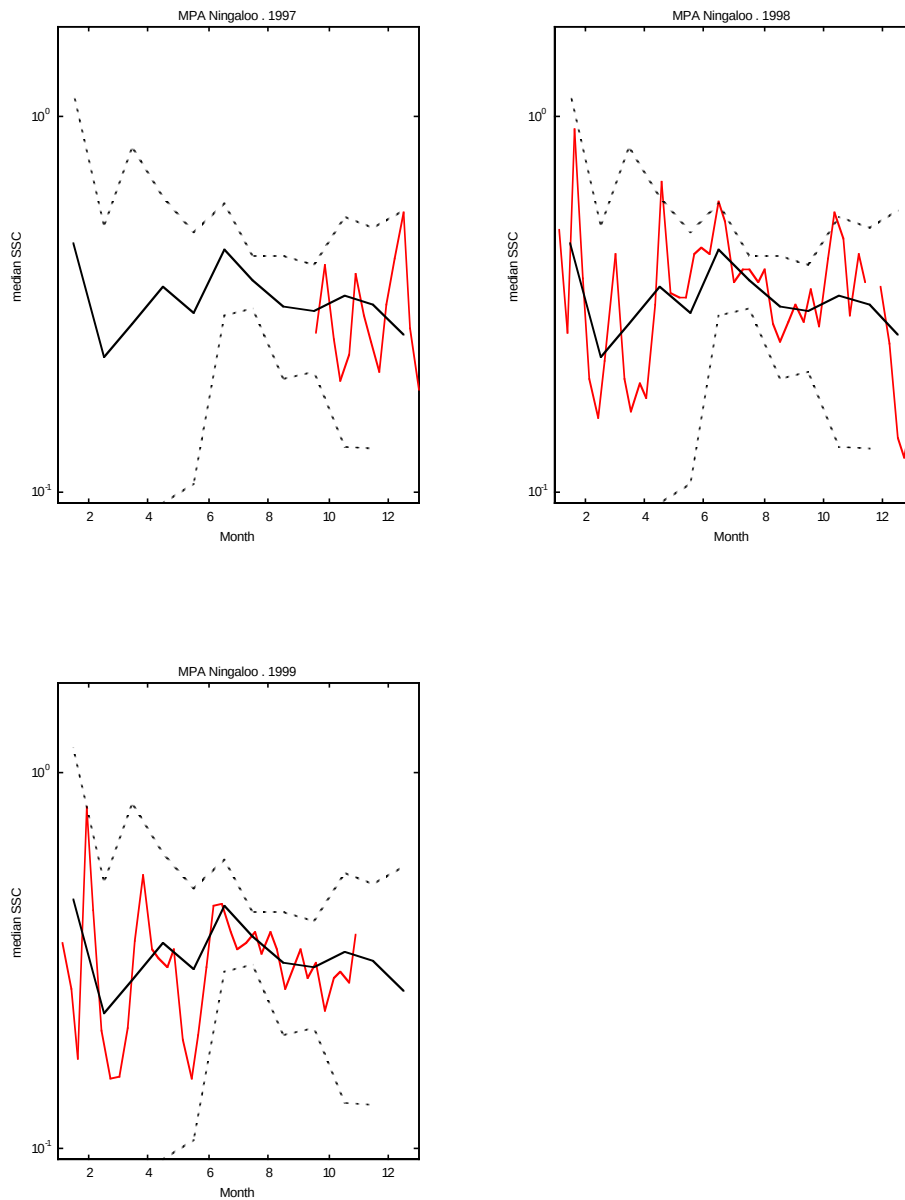


Figure 30. The time series of median SSC at Great Australian Bight by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

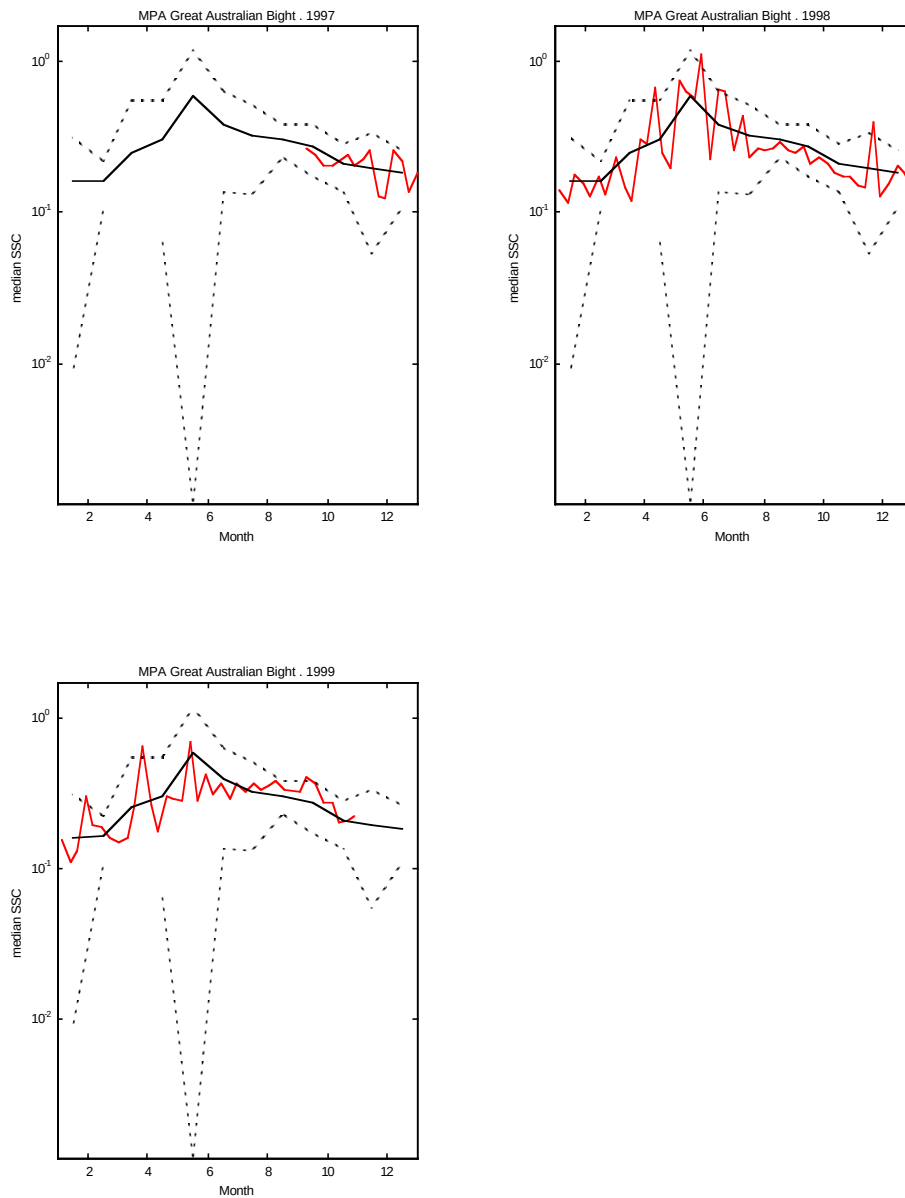


Figure 31. The time series of median SSC at Tasmanian Seamounts by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

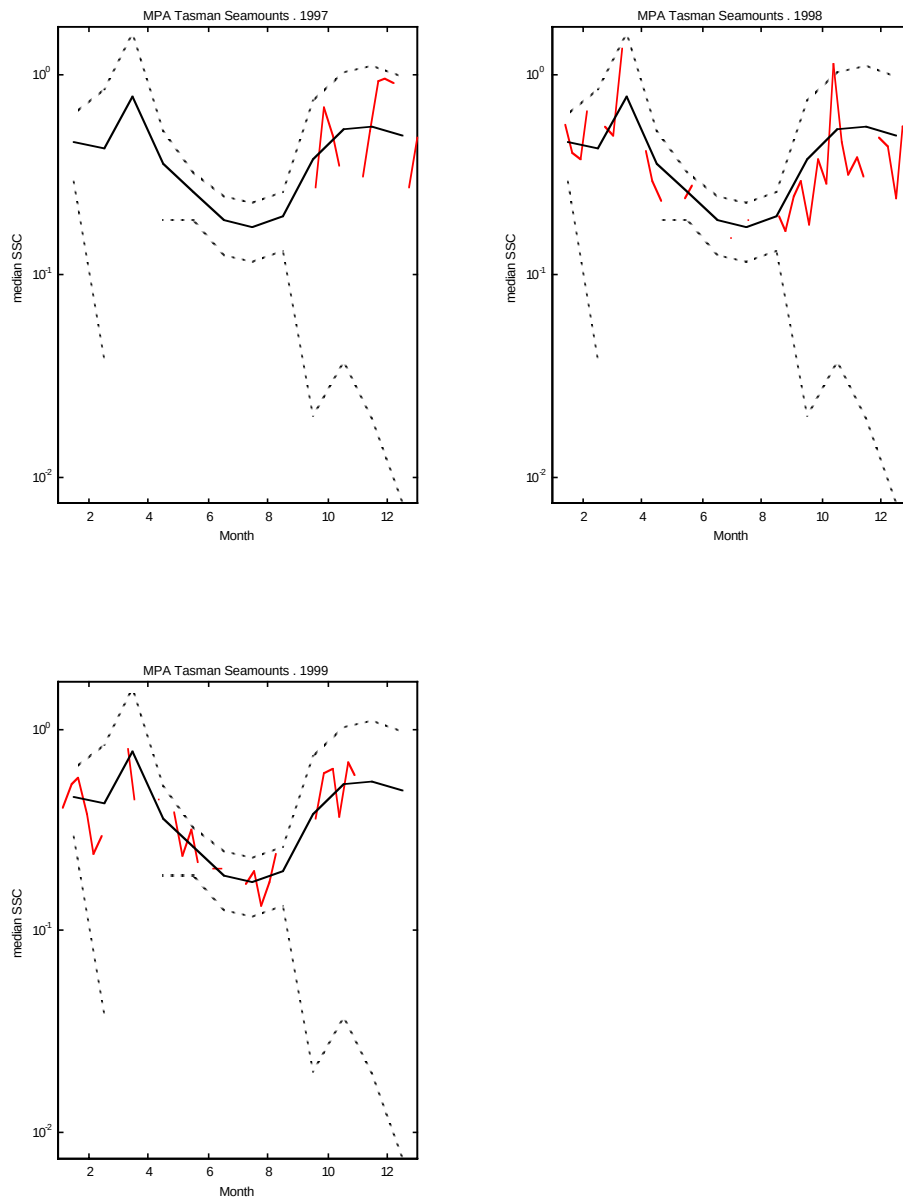


Figure 32. The time series of median SSC at Macquarie Island by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Data from the winter months has been excluded due to poor coverage and ice cover. Note the log-scale for the y-axis.

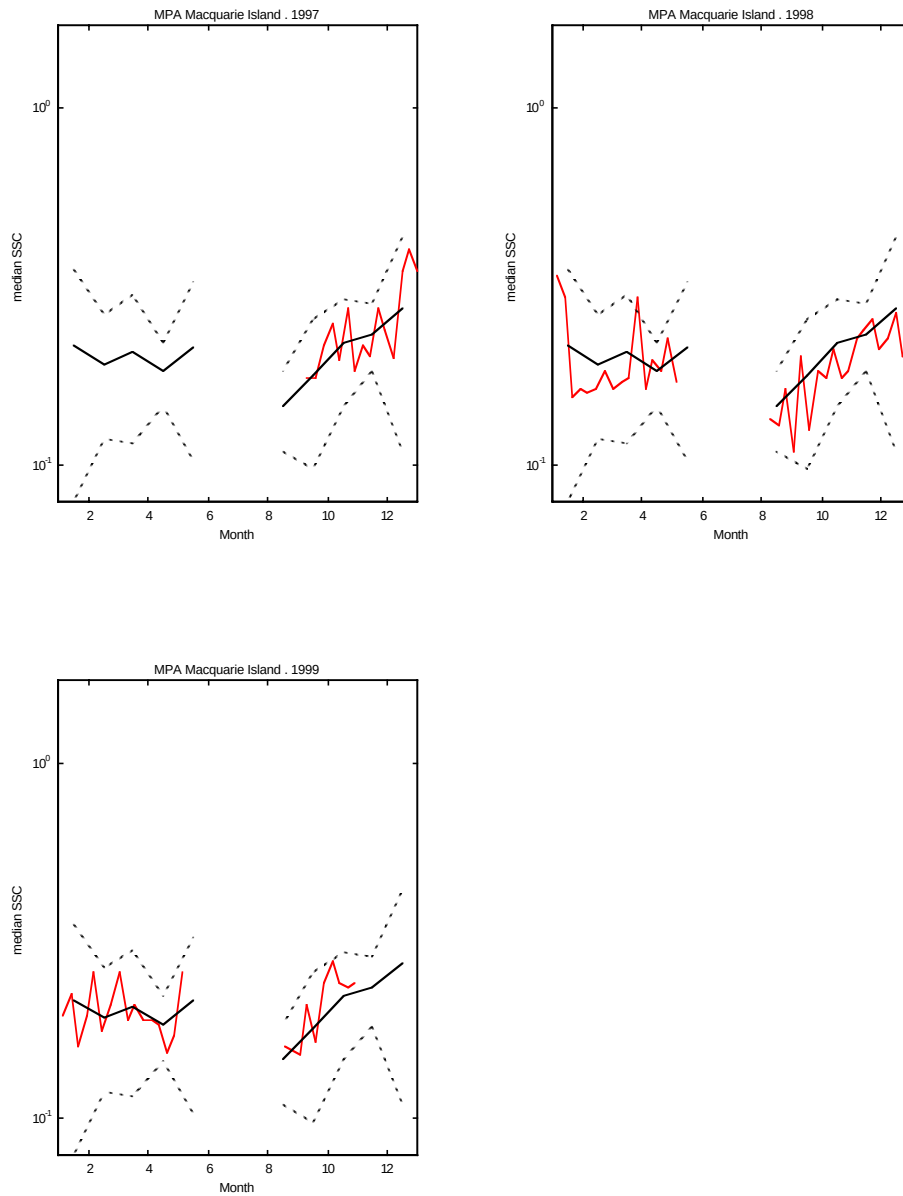


Figure 33. The time series of median SSC at Lord Howe Island by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

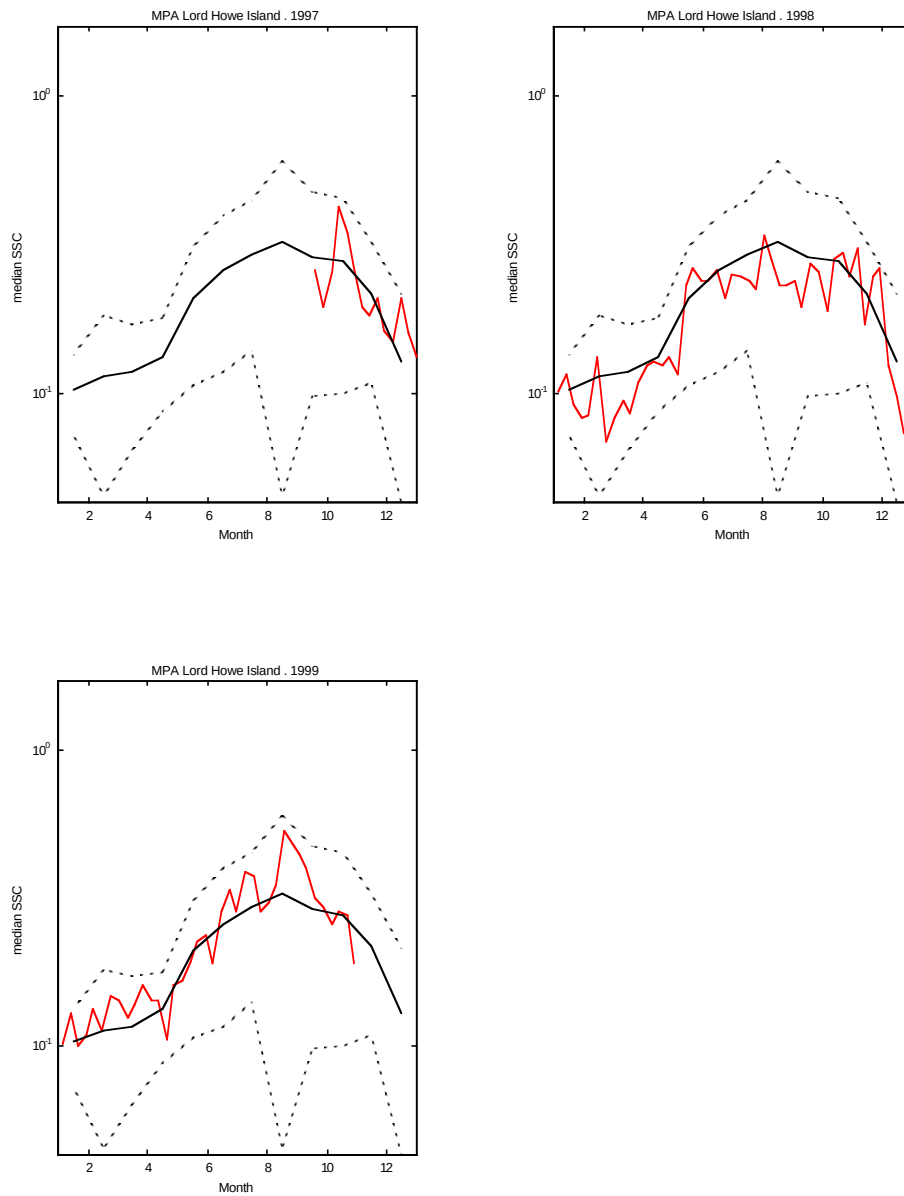


Figure 34. The time series of median SSC at Solitary Islands by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

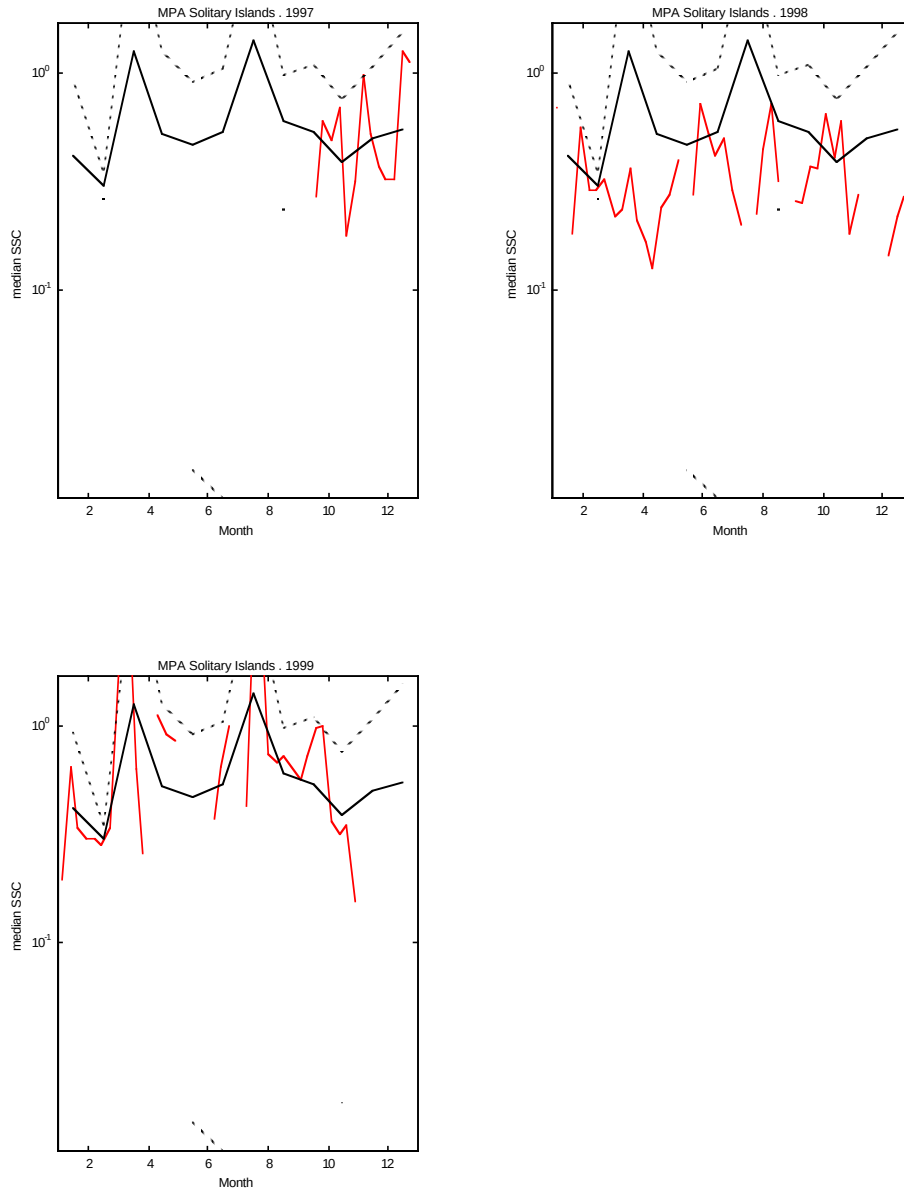


Figure 35. The time series of median SSC at Elizabeth and Middleton Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

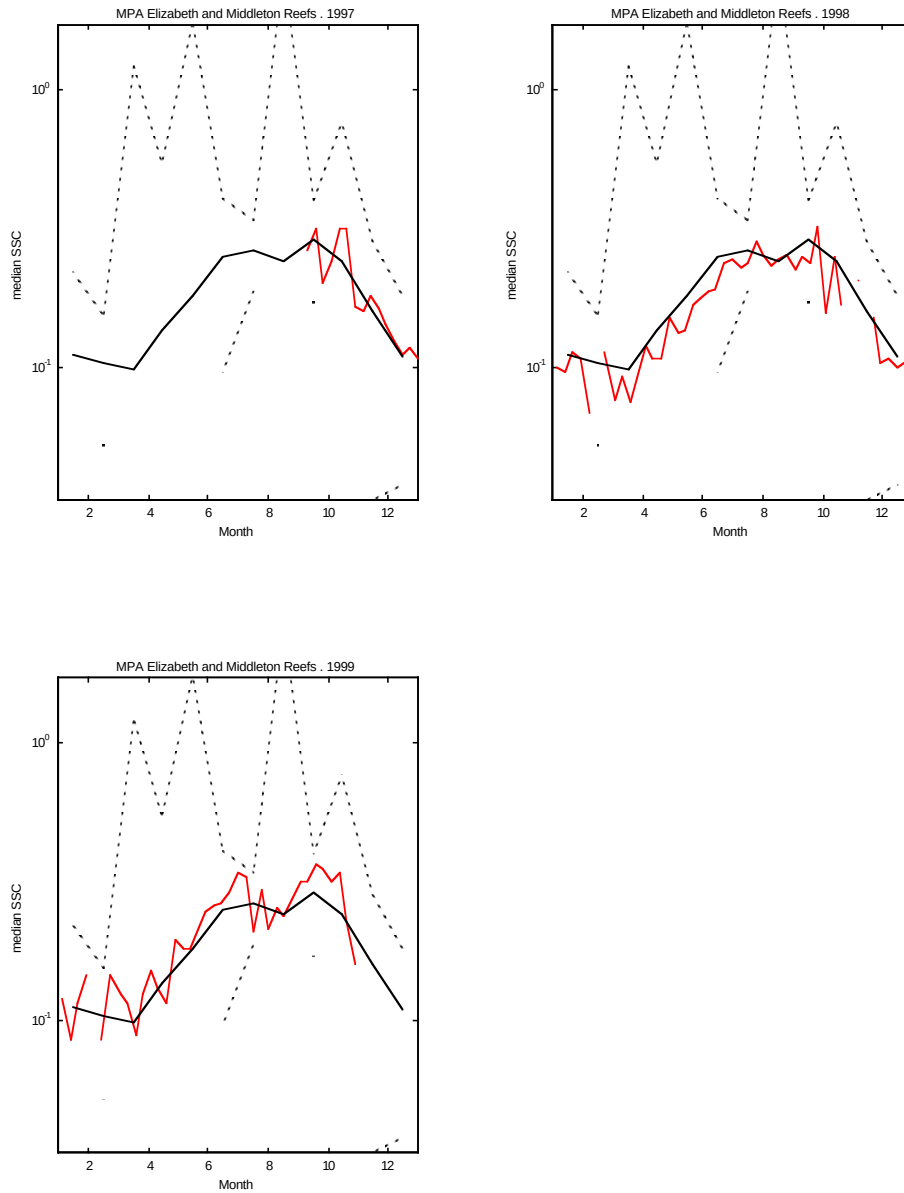


Figure 36. The time series of median SSC at Lihou Reef by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

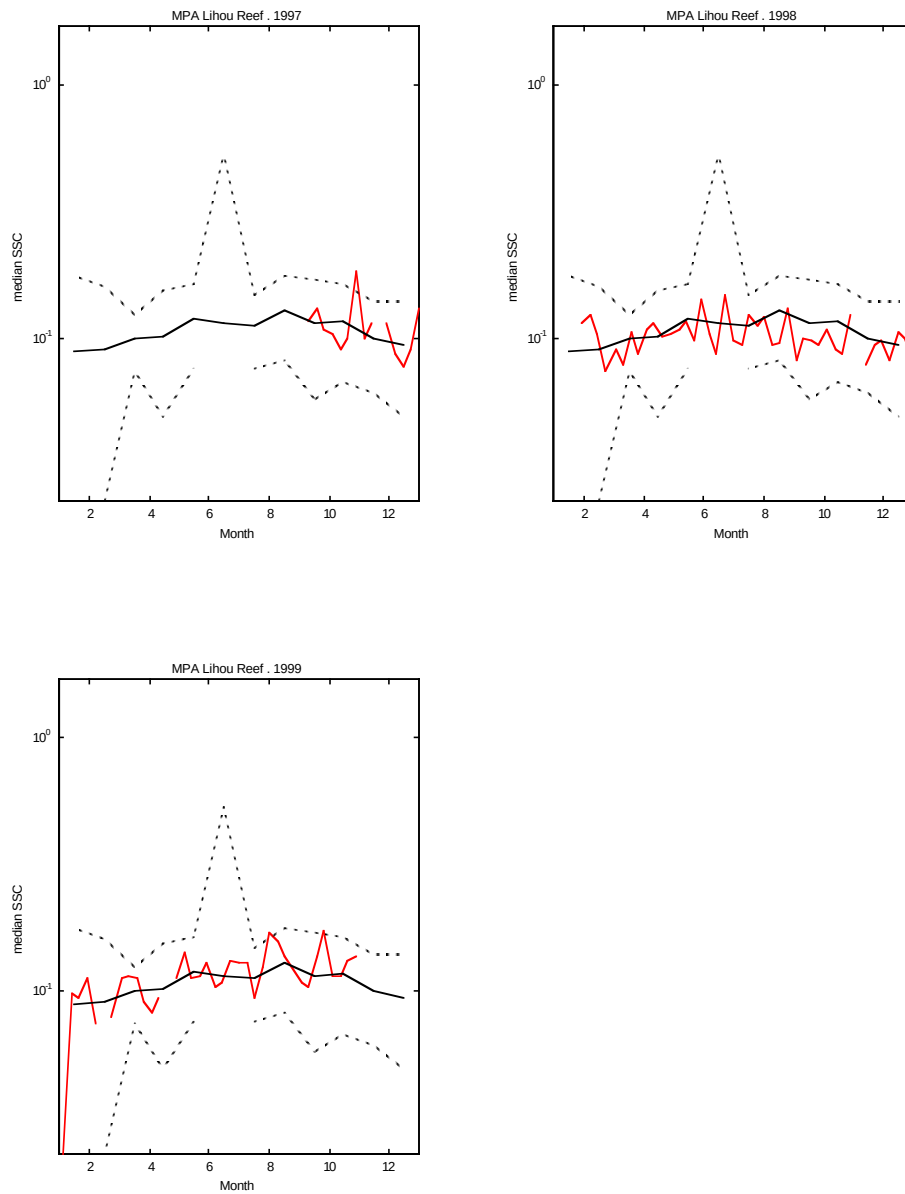


Figure 37. The time series of median SSC at Coringa-Herald by each sampling date, together with the climatology (smooth solid line, dashed line $\pm 2SD$) for the whole period 1997-1999. Note the log-scale for the y-axis.

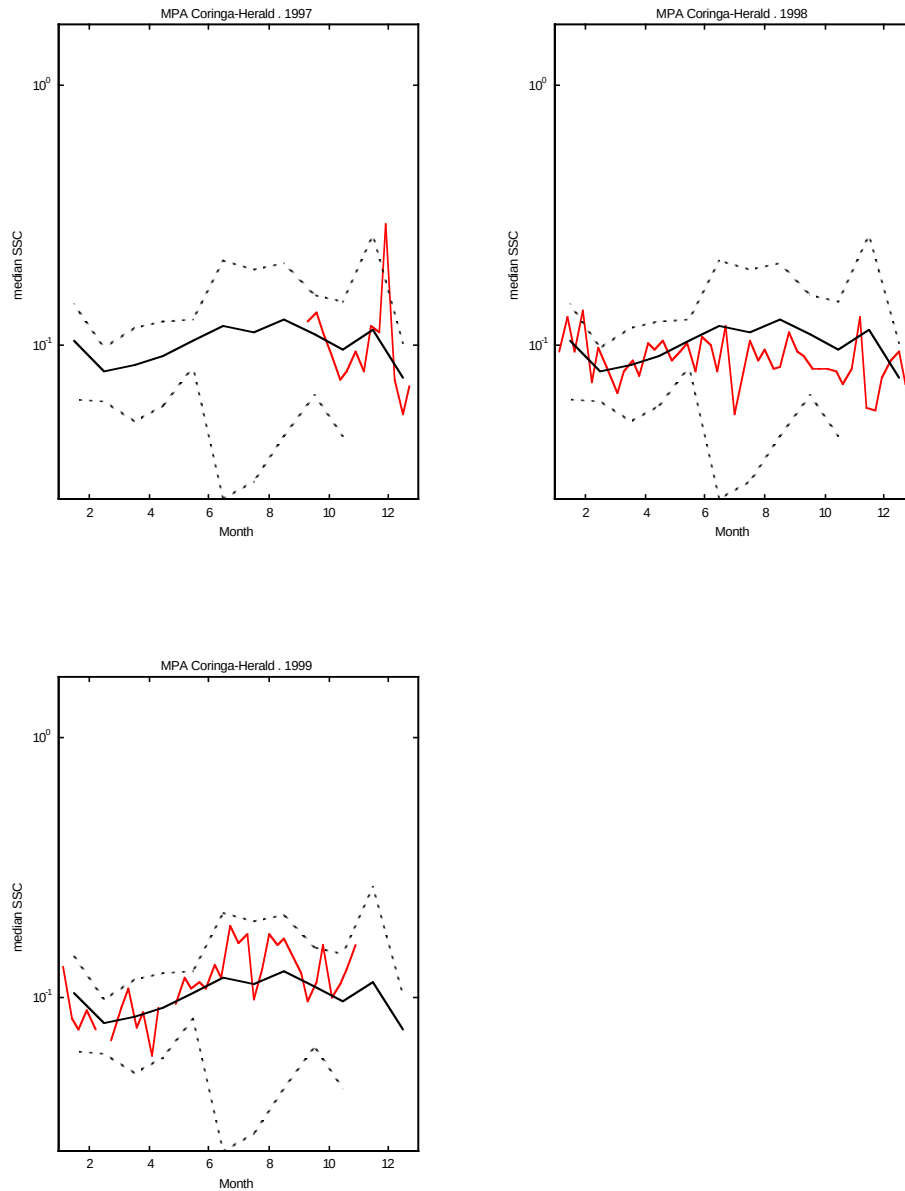


Figure 38. SST habitat areas by month for Ashmore Reef. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

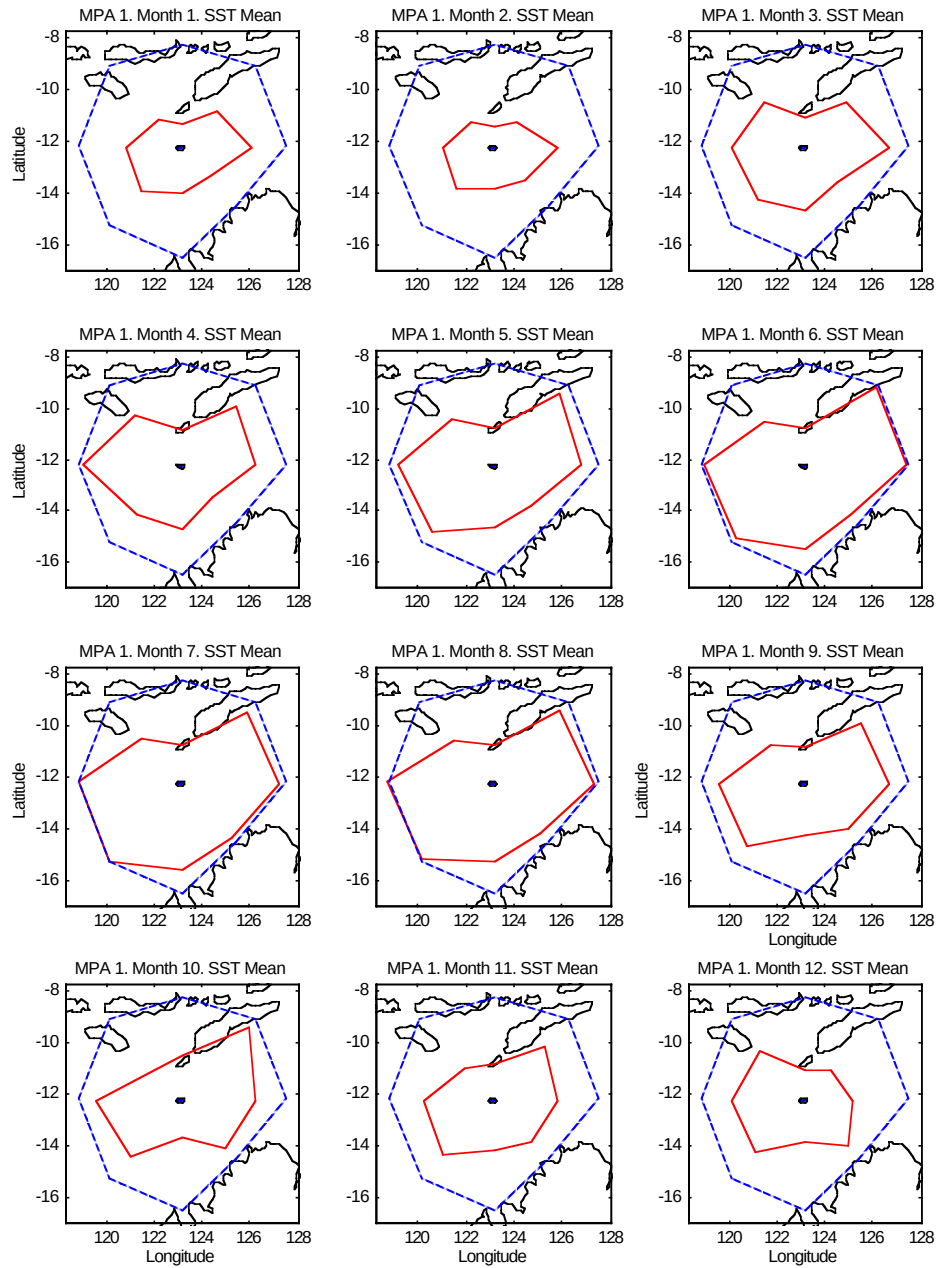


Figure 39. SST habitat areas by month for Cartier Island. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

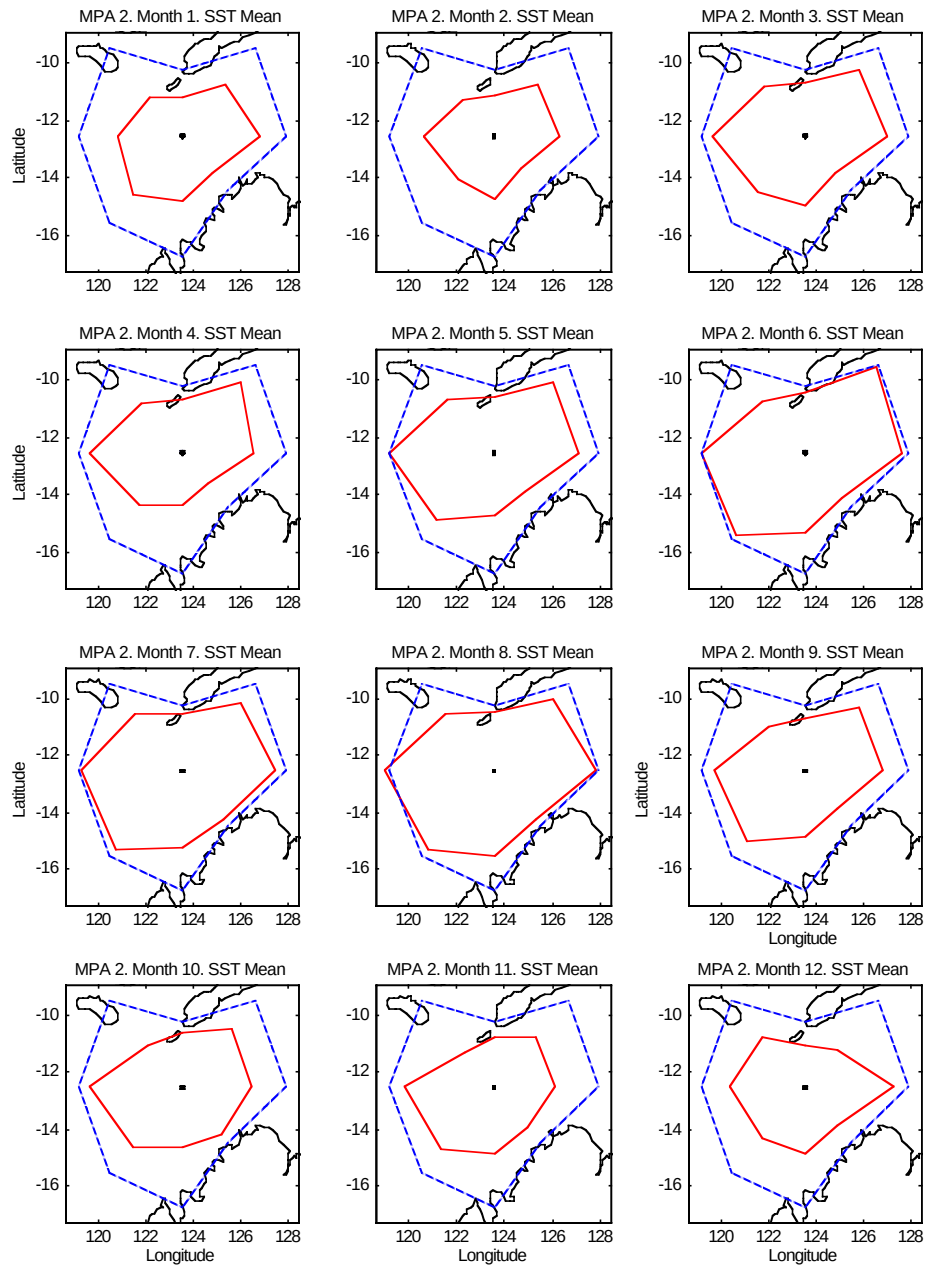


Figure 40. SST habitat areas by month for Mermaid Reef. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

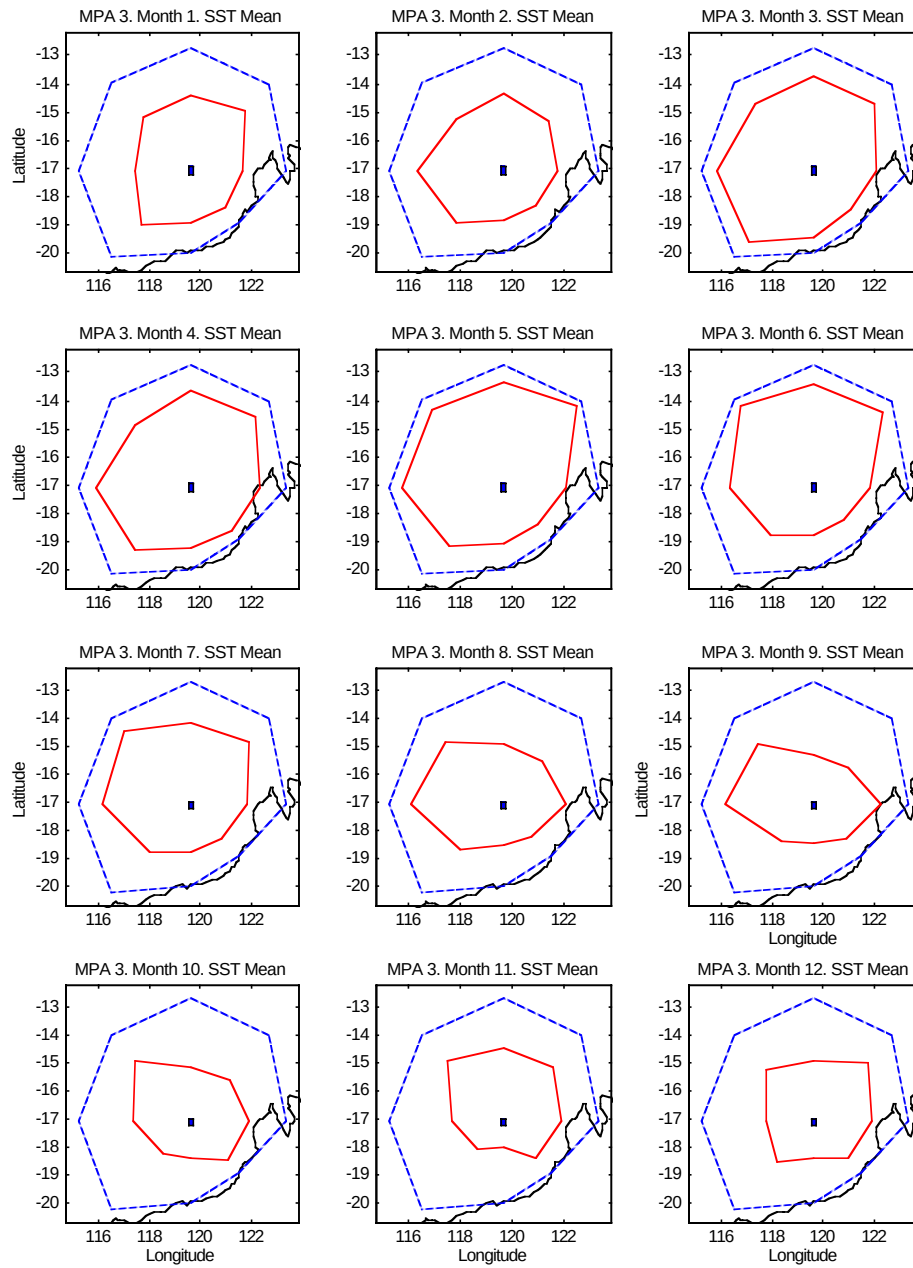


Figure 41. SST habitat areas by month for Ningaloo. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

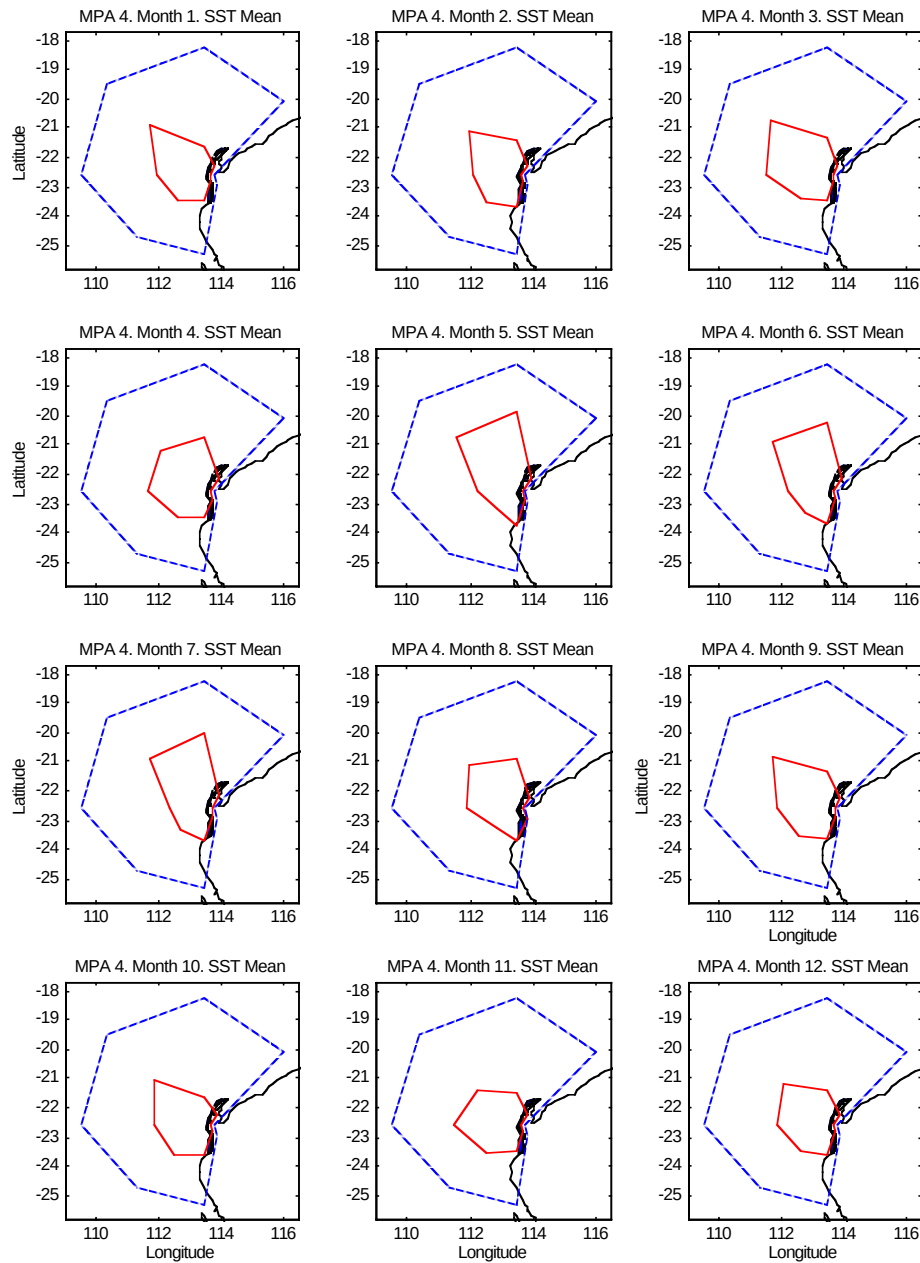


Figure 42. SST habitat areas by month for Great Australia Bight. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

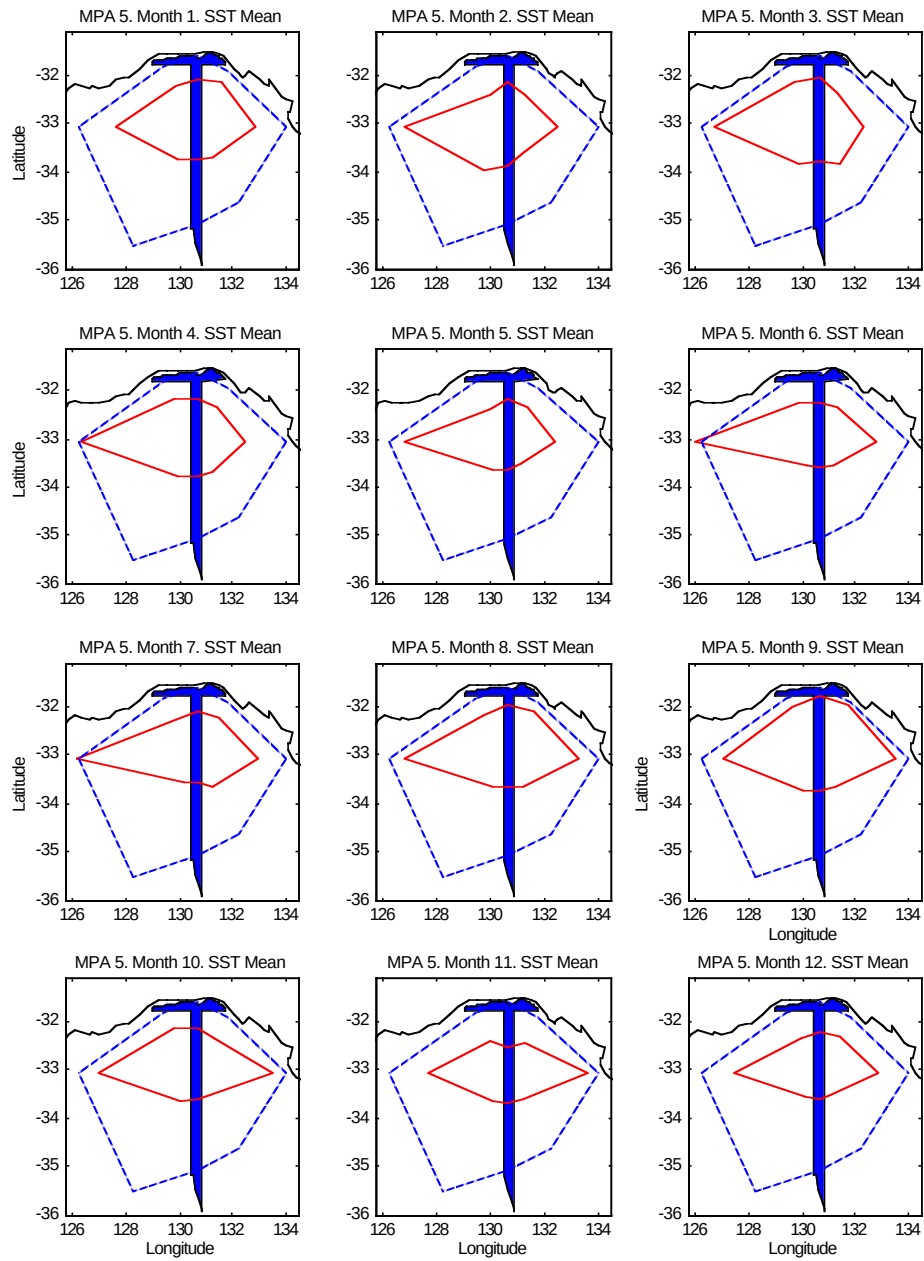


Figure 43. SST habitat areas by month for Tasmanian Seamounts. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

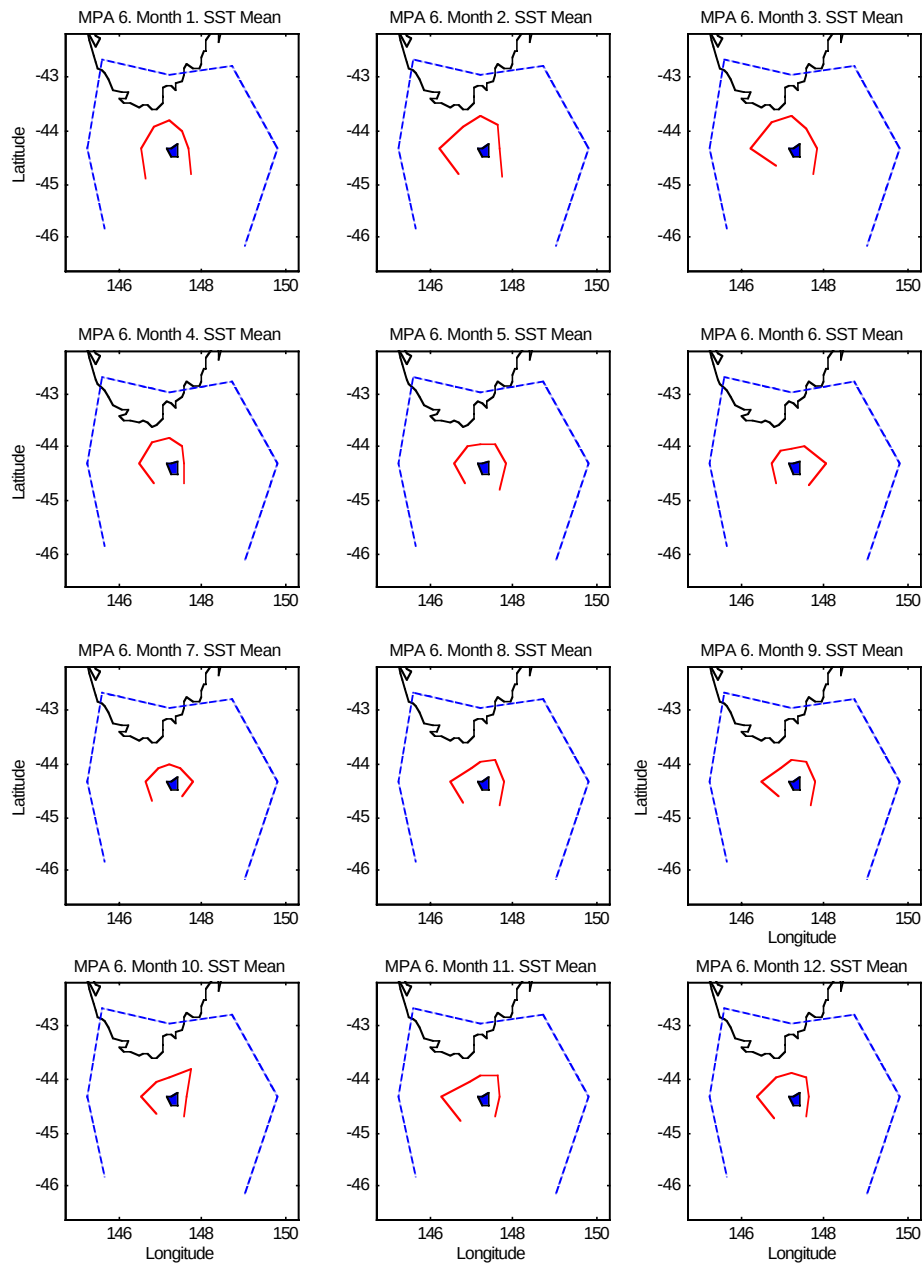


Figure 44. SST habitat areas by month for Lord Howe Island. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

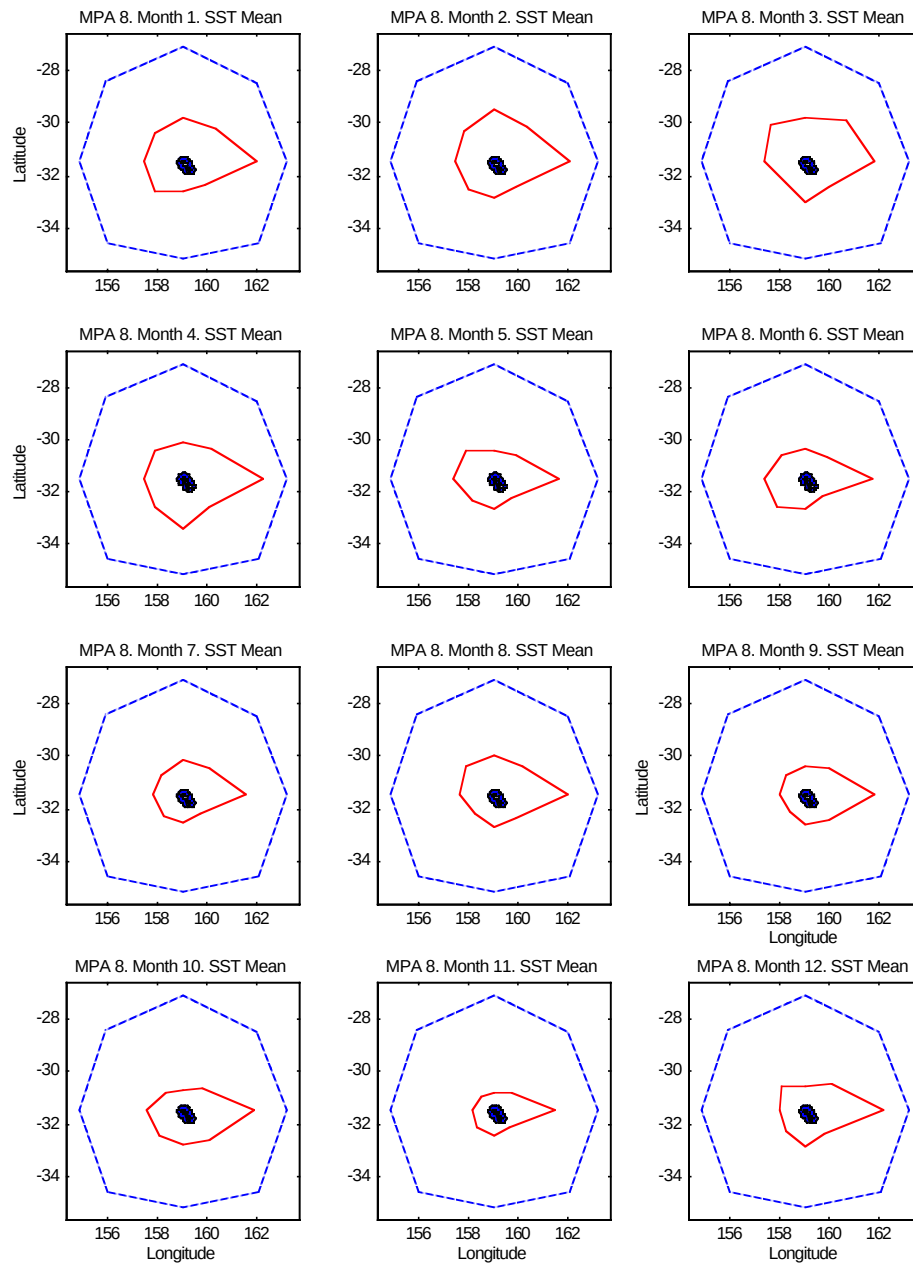


Figure 45. SST habitat areas by month for Solitary Islands. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

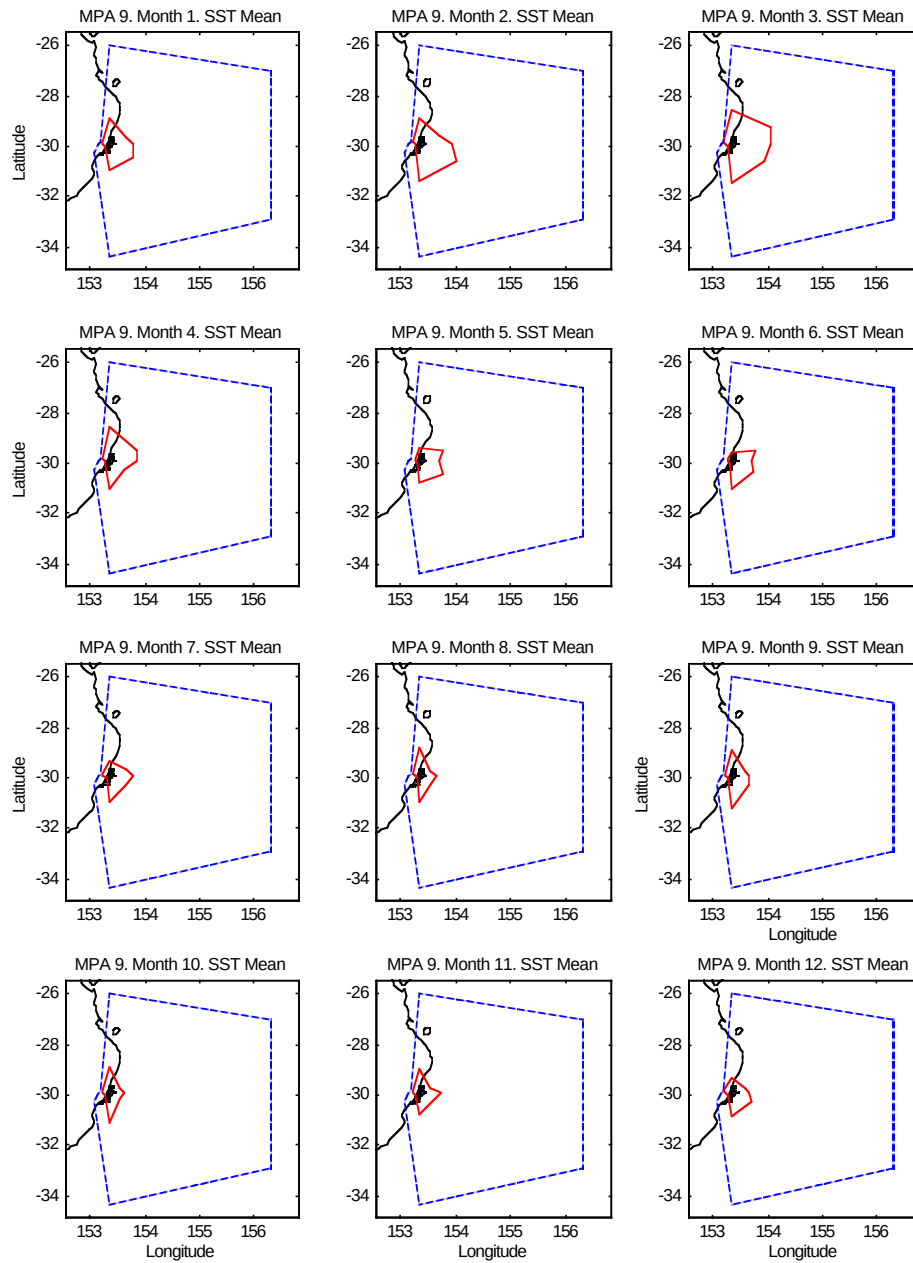


Figure 46. SST habitat areas by month for Elizabeth and Middleton Reefs. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

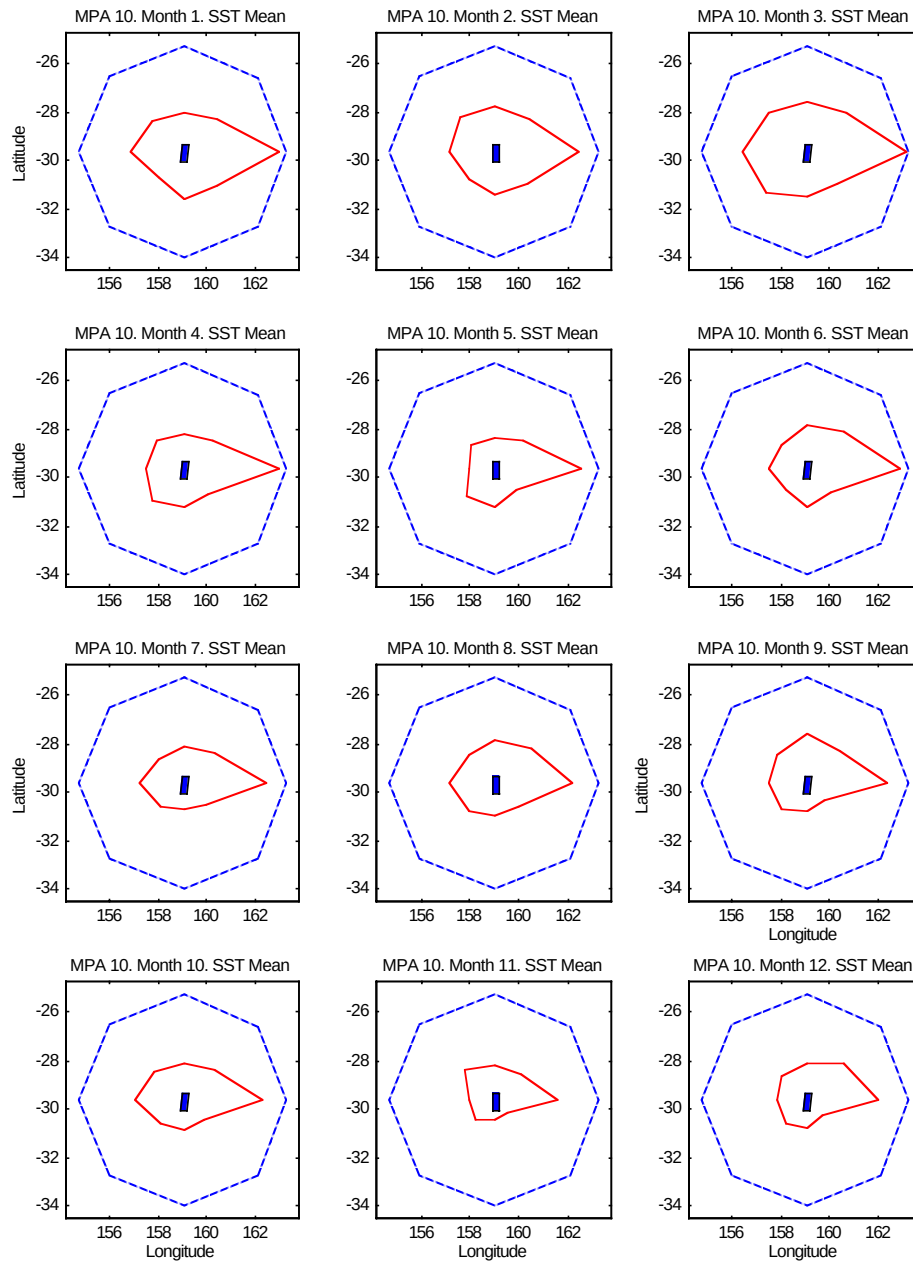


Figure 47. SST habitat areas by month for Lihou Reef. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

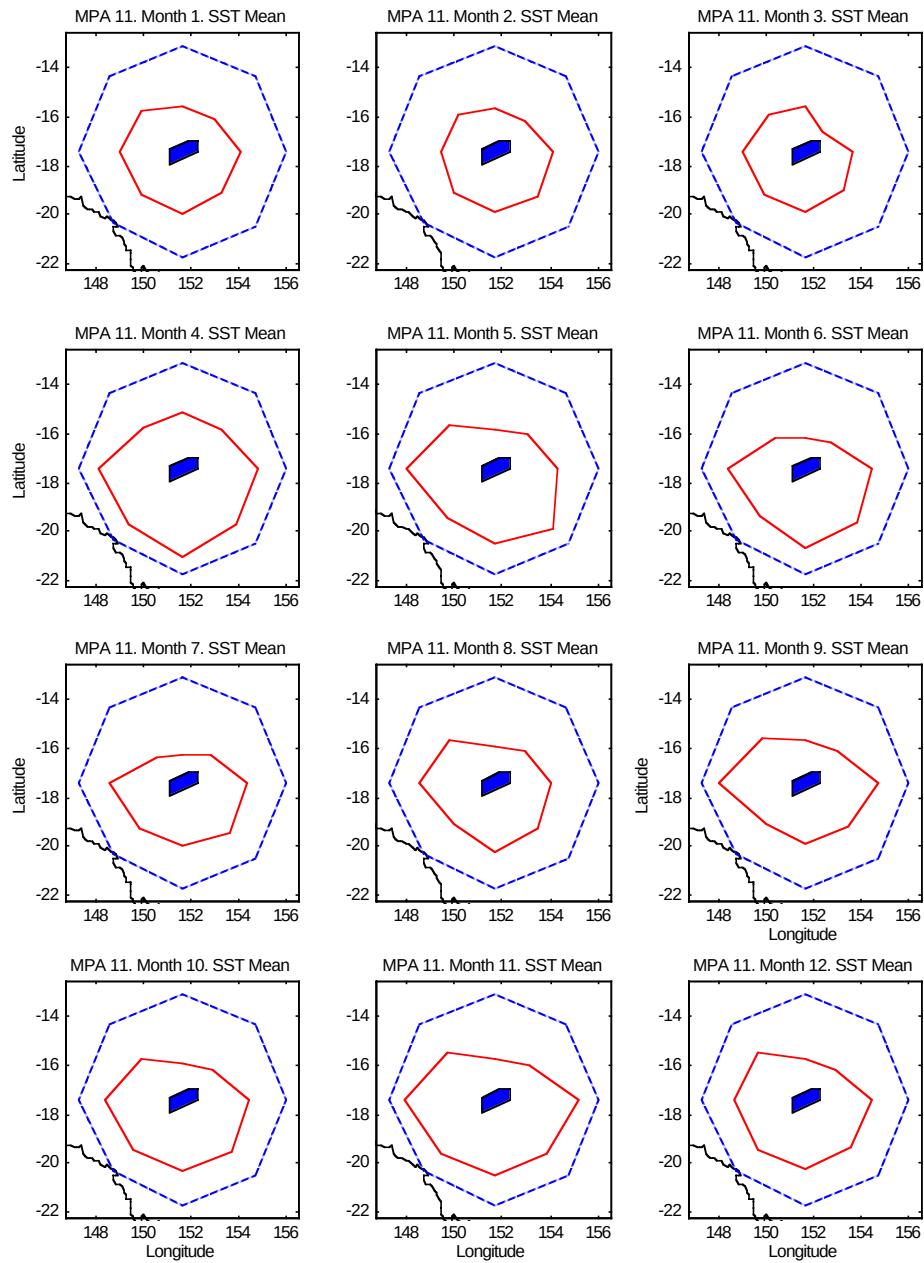


Figure 48. SST habitat areas by month for Coringa-Herald. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

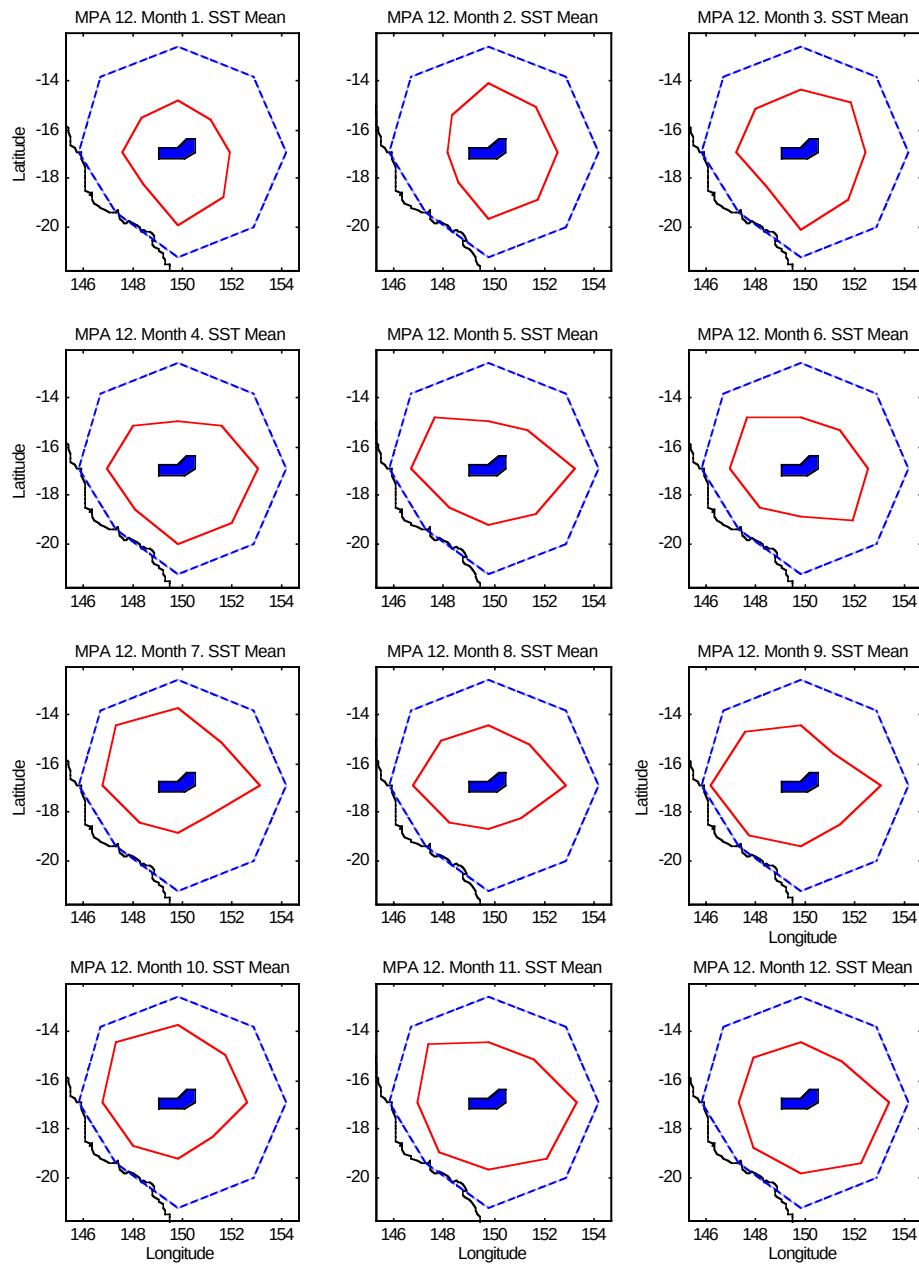


Figure 49. SSC habitat areas by month for Ashmore Reef. The inner solid line is the mean habitat area for the month. The outer dotted line is the maximum extent of the habitat boundary for all dates in each transect direction.

