

# Marine Ecosystem Assessment for the Southern Ocean

The first circumpolar assessment of Southern Ocean ecosystem status and trends

## Outputs and events

### 2018

Hobart International Conference on the Marine Ecosystem Assessment for the Southern Ocean, including a one-day Policy Forum

### 2019

Working Workshop on progressing the first MEASO

### 2019-21

Contributions to Intergovernmental Panel on Climate Change: Special Report on Oceans and Cryosphere in a Changing Climate (Ch 3: Polar Regions), Working Group II (Ch 3: Oceans and Coastal Ecosystems and their Services; Cross-Chapter Paper 6: Polar Regions)

### 2021

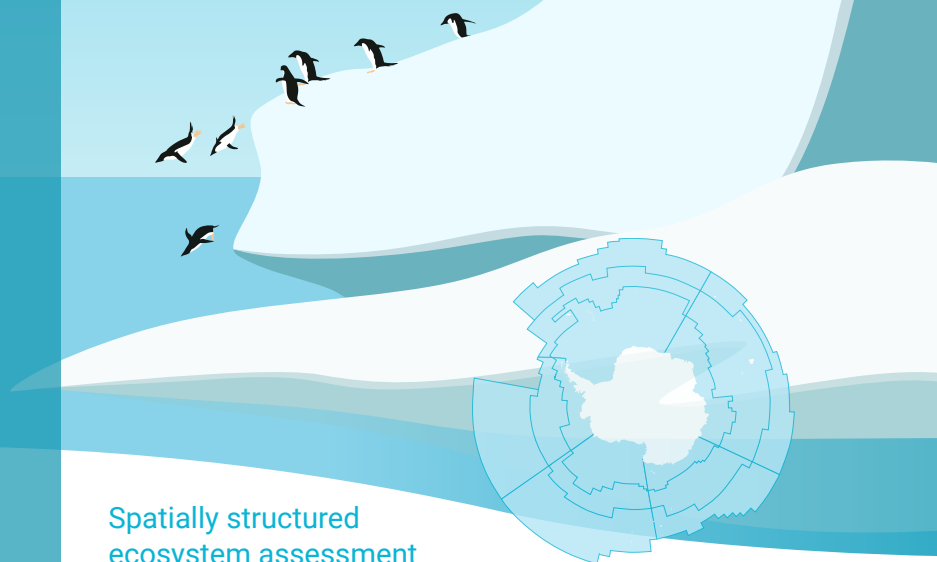
UN Framework Convention on Climate Change, Conference of Parties 26 (UK) - Cryosphere Pavilion Polar Oceans Day: Antarctic marine ecosystems under pressure: protection needs actions locally and globally

### 2022

Presentations to SCAR Open Science Conference and to the Challenger 150 Symposium, among others

Acknowledgement text and pdf URL

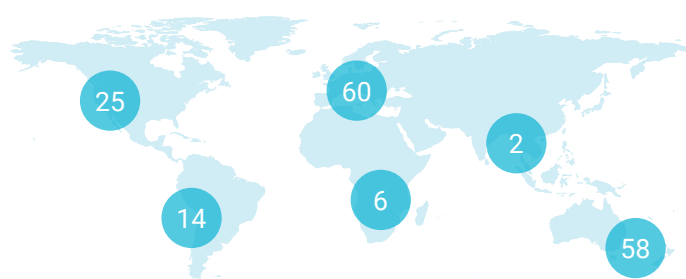
## Overview



### Spatially structured ecosystem assessment

- 5-year international program of ~200 scientists providing a forward-looking assessment of trends in Southern Ocean ecosystems
- Key output of the the IMBeR Program Integrating Climate and Ecosystem Dynamics of the Southern Ocean (ICED) and endorsed by SCAR
- 25 papers submitted with more than 200,000 views across all papers

### Diversity in MEASO



High level of Early Career Researcher involvement and leadership  
>50% female authors



## Publications

<https://www.frontiersin.org/research-topics/10606/marine-ecosystem-assessment-for-the-southern-ocean-meeting-the-challenge-for-conserving-earth-ecosys#overview>

### Context

**Global connectivity of Southern Ocean Ecosystems.** Murphy, E. J., Johnston, N. M., Hofmann, E. E., Phillips, R. A., Jackson, J. A., Constable, A. J., Henley, S. F., Melbourne-Thomas, J., Trebilco, R., Cavanagh, R. D., Tarling, G. A., Saunders, R. A., Barnes, D. K. A., Costa, D. P., Corney, S. P., Fraser, C. I., Höfer, J., Hughes, K. A., Sands, C. J., Thorpe, S. E., Trathan, P. N., & Xavier, J. C. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.624451](https://doi.org/10.3389/fevo.2021.624451)

**From Data to Marine Ecosystem Assessments of the Southern Ocean: Achievements, Challenges, and Lessons for the Future.** Van de Putte, A. P., Griffiths, H. J., Brooks, C., Bricher, P., Sweetlove, M., Halfter, S., & Raymond, B. (2021). *Frontiers in Marine Science*, 8. doi:[10.3389/fmars.2021.637063](https://doi.org/10.3389/fmars.2021.637063)

**Global Drivers on Southern Ocean Ecosystems: Changing Physical Environments and Anthropogenic Pressures in an Earth System.** Morley, S. A., Abele, D., Barnes, D. K. A., Cárdenas, C. A., Cotté, C., Gutt, J., Henley, S. F., Höfer, J., Hughes, K. A., Martin, S. M., Moffat, C., Raphael, M., Stammerjohn, S. E., Suckling, C. C., Tulloch, V. J. D., Waller, C. L., & Constable, A. J. (2020). *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.547188](https://doi.org/10.3389/fmars.2020.547188)

**Local Drivers of Change in Southern Ocean Ecosystems: Human Activities and Policy Implications.** Grant, S. M., Waller, C. L., Morley, S. A., Barnes, D. K. A., Brasier, M. J., Double, M. C., Griffiths, H. J., Hughes, K. A., Jackson, J. A., Waluda, C. M., & Constable, A. J. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.624518](https://doi.org/10.3389/fevo.2021.624518)

### Biota and food webs

**Changing biogeochemistry of the Southern Ocean and its ecosystem implications.** Henley, S. F., Cavan, E. L., Fawcett, S. E., Kerr, R., Monteiro, T., Sherrell, R. M., Bowie, A. R., Boyd, P. W., Barnes, D. K. A., Schloss, I. R., Marshall, T., Flynn, R., & Smith, S. (2020). *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.00581](https://doi.org/10.3389/fmars.2020.00581)

**Responses of Southern Ocean Seafloor Habitats and Communities to Global and Local Drivers of Change.** Brasier, M. J., Barnes, D., Bax, N., Brandt, A., Christianson, A. B., Constable, A. J., Downey, R., Figuerola, B., Griffiths, H., Gutt, J., Lockhart, S., Morley, S. A., Post, A. L., Van de Putte, A., Saeedi, H., Stark, J. S., Sumner, M., & Waller, C. L. (2021). *Frontiers in Marine Science*, 8, 30. doi:[10.3389/fmars.2021.622721](https://doi.org/10.3389/fmars.2021.622721)

**Evidence for the Impact of Climate Change on Primary Producers in the Southern Ocean.** Pinkerton, M. H., Boyd, P. W., Deppeler, S., Hayward, A., Höfer, J., & Moreau, S. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.592027](https://doi.org/10.3389/fevo.2021.592027)

**Status, change and futures of zooplankton in the Southern Ocean.** Johnston, N. M., Murphy, E. J., Atkinson, A. A., Constable, A. J., Cotté, C. S., Cox, M., Daly, K., Driscoll, R., Flores, H., Halfter, S., Henschke, N., Hill, S. L., Höfer, J., Hunt, B. P. V., Kawaguchi, S., Lindsay, D. J., Loeb, V., Manno, C., Meyer, B., Pakhomov, E., Pinkerton, M. H., Reiss, C., Richerson, K., Smith, W., Steinberg, D. K., Swadling, K. M., Tarling, G. A., Thorpe, S. E., Veytia, D., Ward, P., Weldrick, C. K., & Yang, G. (2022). *Frontiers in Ecology and Evolution*. doi:[10.3389/fevo.2021.624692](https://doi.org/10.3389/fevo.2021.624692)

**Productivity and Change in Fish and Squid in the Southern Ocean.** Caccavo, J. A., Christiansen, H., Constable, A. J., Ghigliotti, L., Trebilco, R., Brooks, C. M., Cotte, C., Desvignes, T., Dornan, T., Jones, C. D., Koubbi, P., Saunders, R. A., Stobel, A., Vacchi, M., van de Putte, A. P., Walters, A., Waluda, C. M., Woods, B. L., & Xavier, J. C. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.624918](https://doi.org/10.3389/fevo.2021.624918)

**Marine Ecosystem Assessment for the Southern Ocean: Birds and Marine Mammals in a Changing Climate.** Bestley, S., Ropert-Coudert, Y., Bengtson Nash, S., Brooks, C. M., Cotté, C., Dewar, M., Friedlaender, A. S., Jackson, J. A., Labrousse, S., Lowther, A. D., McMahon, C. R., Phillips, R. A., Pistorius, P., Puskic, P. S., Reis, A. O. d. A., Reisinger, R. R., Santos, M., Tarsisz, E., Tixier, P., Trathan, P. N., Wege, M., & Wienecke, B. (2020). *Frontiers in Ecology and Evolution*, 8. doi:[10.3389/fevo.2020.566936](https://doi.org/10.3389/fevo.2020.566936)

**Biological responses to change in Antarctic sea ice habitats.** Swadling, K.M., Constable, A.J., Fraser, A.D., Massom, R.A., Borup, M.D., Ghigliotti, L., Granata, A., Guglielmo, L., Kawaguchi, S., Kennedy, F., Kiko, R., Koubbi, P., Makabe, R., Martin, A., McMinn, A., Moteki, M., Pakhomov, E.A., Peeken, I., Reimer, J., Reid, P., Ryan, K., Vacchi, M., Virtue, P., Weldrick, C.K., Wongpan, P., Wotherspoon, S.J. (in review) *Frontiers in Ecology and Evolution*.

**Southern Ocean Food Web Modelling: Progress, Prognoses, and Future Priorities for Research and Policy Makers.** McCormack, S. A., Melbourne-Thomas, J., Trebilco, R., Griffith, G., Hill, S. L., Hoover, C., Johnston, N. M., Marina, T. I., Murphy, E. J., Pakhomov, E. A., Pinkerton, M., Plagányi, É., Saravia, L. A., Subramaniam, R. C., Van de Putte, A. P., & Constable, A. J. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.624763](https://doi.org/10.3389/fevo.2021.624763)

### Challenges for policy makers

**Future risk for Southern Ocean ecosystem services under climate change.** Cavanagh, R. D., Melbourne-Thomas, J., Grant, S. M., Barnes, D. K. A., Hughes, K. A., Halfter, S., Meredith, M. P., Murphy, E. J., Trebilco, R., & Hill, S. L. (2021). *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.615214](https://doi.org/10.3389/fmars.2020.615214)

**Future Antarctic coastal ecosystems under global change.** Höfer, J., Barnes, D.K.A., Piñones, A., Schloss, I.R., Stark, J.S. (in review) *Frontiers in Marine Science*

**Changing distributions of habitats in the Southern Ocean: implications for science and management.** Weldrick, C.K. et al. (in prep)

**"Sentinel" observations to support conservation and management of Southern Ocean ecosystems.** Muelbert, M.C., Schloss, I. et al. (in prep)

### Foundations and extensions of MEASO

**Phenology and environmental control of phytoplankton blooms in the Kong Håkon VII Hav in the Southern Ocean.** Kauko, H. M., Hattermann, T., Ryan-Keogh, T., Singh, A., de Steur, L., Fransson, A., Chierici, M., Falkenheug, T., Hallfredsson, E. H., Bratbak, G., Tsagaraki, T., Berge, T., Zhou, Q., & Moreau, S. (2021). *Frontiers in Marine Science*, 8. doi:[10.3389/fmars.2021.623856](https://doi.org/10.3389/fmars.2021.623856)

**Subsurface Chlorophyll-a maxima in the Southern Ocean.** Baldry, K., Strutton, P. G., Hill, N. A., & Boyd, P. W. (2020). *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.00671](https://doi.org/10.3389/fmars.2020.00671)

**A review and meta-analysis of potential impacts of ocean acidification on marine calcifiers from the Southern Ocean.** Figuerola, B., Hancock, A. M., Bax, N., Cummings, V. J., Downey, R., Griffiths, H. J., Smith, J., & Stark, J. S. (2021). *Frontiers in Marine Science*, 8. doi:[10.3389/fmars.2021.584445](https://doi.org/10.3389/fmars.2021.584445)

**Interaction of the Antarctic Circumpolar Current with seamounts fuels moderate blooms but vast foraging grounds for multiple marine predators.** Sergi, S., Baudena, A., Cotté, C., Ardyna, M., Blain, S., & d'Ovidio, F. (2020). *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.00416](https://doi.org/10.3389/fmars.2020.00416)

### Giving effect to MEASO

**Science and policy interactions in assessing and managing marine ecosystems in the Southern Ocean.** Press, A. J. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.576047](https://doi.org/10.3389/fevo.2021.576047)

**Overcoming the obstacles faced by Early Career Researchers in marine science: lessons from the Marine Ecosystem Assessment for the Southern Ocean.** Brasier, M. J., McCormack, S., Bax, N., Caccavo, J. A., Cavan, E., Ericson, J. A., Figuerola, B., Hancock, A., Halfter, S., Hellessey, N., Höfer, J., Puskic, P. S., de Oliveira, C. S., Subramaniam, R. C., Wallis, J., & Weldrick, C. K. (2020). *Frontiers in Marine Science*, 7. doi:[10.3389/fmars.2020.00692](https://doi.org/10.3389/fmars.2020.00692)

**Stakeholder engagement in decision making and pathways of influence for Southern Ocean ecosystem services.** Solomonsz, J., Melbourne-Thomas, J., Constable, A., Trebilco, R., van Putten, I., & Goldsworthy, L. (2021). *Frontiers in Marine Science*, 8. doi:[10.3389/fmars.2021.623733](https://doi.org/10.3389/fmars.2021.623733)

**Enabling enduring evidence-based policy for the Southern Ocean through cultural arts practices.** Roberts, L., Kutay, C., Melbourne-Thomas, J., Petrou, K., Benson, T. M., Fiore, D., Fletcher, P., Johnson, E., Silk, M., Taberner, S., Filgueira, V. V., & Constable, A. J. (2021). *Frontiers in Ecology and Evolution*, 9. doi:[10.3389/fevo.2021.616089](https://doi.org/10.3389/fevo.2021.616089)

**A dynamic framework for assessing and managing risks to ecosystems from fisheries: demonstration for conserving the krill-based food web in Antarctica.** Constable, A.J., Kawaguchi, S., Sumner, M., Trathan, P., Warwick-Evans, V. (in review) *Frontiers in Ecology and Evolution*

**Using a Risk Assessment Framework to spatially and temporally spread the fishery catch limit for Antarctic krill in the west Antarctic Peninsula: a template for krill fisheries elsewhere.** Warwick-Evans, V., Andrew J Constable, A.J., Dalla Rosa, L., Secchi, E., Seyboth, E., Trathan, P. (in review) *Frontiers in Marine Science*.