# Proposal Template: SOOS Capability Working Groups

SOOS Capability Working Groups (CWGs) provide the community with a framework in which to deliver actions that enhance our ability to make observations in the Southern Ocean. They do this through either addressing bottlenecks in data required for the Key Science Challenges, or by contributing to the SOOS Foundational Capabilities, identified in the [SOOS 2021-2025 Science and Implementation Plan](https://soos.aq/images/soos/about_us/DRAFT_ScienceandImplementationPlan2021_2025.pdf).

SOOS CWGs propose their own leadership, however SOOS has some requirements for the selection and conduct of the CWG Co-chairs (and leadership group), which are outlined in the [SOOS Governance Terms of Reference](https://soos.aq/joomla/images/soos/about_us/governance_terms_of_reference.pdf).

Further, whilst CWGs also define their own objectives, SOOS encourages all groups to consider the following objectives as part of their proposal:

1. Establish links with existing and emerging programs of relevance to the proposed capability working group
2. Convene focussed sessions at national and international meetings, and facilitate synthesis products, to increase the awareness of the scientific community to the importance of the activities and outcomes of this working group
3. Provide support to International Program Office (IPO) by providing annual reports, and content for the IPO website and newsletters on the activities and outcomes of the proposed CWG
4. Ensure all products of the WG acknowledge SOOS

To propose a new SOOS CWG, please fill in the form below. Contact the IPO staff if you have any questions.

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## Capability Working Group Title\*

Please propose a concise Capability Working Group (CWG) title and acronym (if applicable)

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## Capability Working Group Mission\*

Please outline concise WG mission statement

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## Capability Working Group Key Objective(s)\*

Please outline concise WG objective(s)

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## Description of the Working Group\*

Please provide a short overview of the scientific rationale and scope of the CWG, which can be used on the website and in other communications

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## Participants\*

SOOS recommends a 3-tiered structure to each CWG:

* Two Co-Chairs (with balance in nationality, gender, and expertise where possible). A full description of the co-chair role can be found in the [SOOS Governance TORs](https://soos.aq/joomla/images/soos/about_us/governance_terms_of_reference.pdf)
* A leadership group (up to ~10 people centrally involved in the actions of the CWG, with balance in nationality, gender and expertise where possible). If elections of co-chairs are required during the life of the CWG, the Leadership Group should provide the nominees.
* A larger, fully open membership of interested community members, who should receive updates and information from the Leadership Group on the activities of the CWG, and may engage in meetings or product development

SOOS also recommends each CWG have an Early Career Professional position as part of the Leadership Group. This is usually coordinated by the IPO through an open call for nominations with the Association of Polar Early Career Scientists (APECS).

Please fill in the table below with proposed WG leadership. If the recommended structure does not suit your proposed CWG, please modify accordingly. If Co-Chair terms are shorter than the life of the CWG, please indicate term length.

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| **Name** | **Affiliation** | **Nationality** | **Expertise** | **Gender**  (Male, female, non-binary, other, prefer not to say) | **WG Role** (Co-Chair, Leadership Group (LG), General Member (GM) |
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## Delivery into SOOS Science and Implementation Plan\*

All SOOS working groups play an active role in delivering into the [SOOS 2021-2025 Science and Implementation Plan](https://soos.aq/images/soos/about_us/DRAFT_ScienceandImplementationPlan2021_2025.pdf). Full descriptions of the Science Themes, Key Challenges and Foundational Capabilities are all available in the [SOOS 2021-2025 Science and Implementation Plan](https://soos.aq/images/soos/about_us/DRAFT_ScienceandImplementationPlan2021_2025.pdf).

Please indicate below, which of the 5 SOOS Science Themes, Key Challenges and/or Foundational Capabilities the proposed WG will deliver into:

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| **Science Theme (ST), Key Challenge (KC) or Foundational Capability (FC)** | **Contribute?**  **(Y or leave blank)** |
| ST1: Understanding and quantifying the state and variability of the Southern Ocean Cryosphere |  |
| KC1: Understand ocean properties, processes and circulation beneath ice shelves and Antarctic sea ice with emphasis on:   * Space and time variability * Modulation by sea ice and the role of polynas * Ice loss and ice sheet mass balance * Heat transfer and freshwater flux between sea ice/ice shelf and ocean |  |
| KC2: Understand influences of changes in freshwater fluxes from iceberg melting, sub-ice shelf melting, subglacial discharge and sea ice |  |
| KC3: Quantify sea ice-ocean-atmosphere characteristics and processes including wave-ice interaction and deformation processes to understand:   * Processes that drive change and variability in the volume, properties, floe-size and distribution of Antarctic sea ice and consequent impacts on atmospheric and oceanic properties and circulations * Changes in sea ice area and volume over seasonal, annual, decadal, and millennial timescales * Dynamics of the Antarctic fast-ice belt and its role in protecting glacier/ice shelf fronts, polynya formation/maintenance and water-mass modification |  |
| KC4: Understand changes in the Antarctic Ice Sheet and its impact on global sea level to improve projections and predictions of future states |  |
| KC5: Improve subglacial and continental shelf bathymetry |  |
| ST2: Understanding and quantifying the state and variability of the Southern Ocean Circulation |  |
| KC1: Understand the impact of Southern Ocean heat, freshwater and carbon exchange and storage on the global ocean. This includes:   * Production and export of bottom water * Upwelling of deep water * Formation and subduction of mode and intermediate waters |  |
| KC2: Understand fundamental processes in the Southern Ocean and their likely changes in the future. This includes:   * Interior water mass transformation due to iso/diapycnal mixing * Processes and forcing mediating upwelling/subduction from the mixed layer * Role of mesoscale and submesoscale eddies in setting water mass properties and mediating the overturning circulation * Stability of the upper ocean overturning circulation in response to changes in winds, increased ice melt and surface warming * Response of the ocean circulation to atmospheric variability (wind, air-sea heat and freshwater fluxes) * Stability, variability and future trends in frontal positions |  |
| KC3: Understand the role of climate change on the Southern Ocean, notably the impact of heat and carbon on mass properties, formation and circulation, and the changes in surface fluxes and freshwater input from the cryosphere |  |
| ST3: Understanding and quantifying the state and variability of Southern Ocean carbon and other biogeochemical cycles |  |
| KC1: Constrain variability in the Southern Ocean CO2 sink over different temporal scales and across regions |  |
| KC2: Evaluate the contribution of seasonally ice-covered areas to carbon uptake and export |  |
| KC3: Assess the extent and impact of ocean acidification across the Southern Ocean |  |
| KC4: Assess the spatial, seasonal and interannual distribution of climate-active gases and halogens in ice-covered and ice-free waters |  |
| KC5: Determine the key drivers of primary productivity and the Biological Carbon Pump (light, stratification, circulation, and supply of micro- and macronutrients) and assess ongoing changes in these parameters |  |
| KC6: Quantify the impact of recycling and remineralization, including via the Microbial Carbon Pump, on nutrients and carbon cycling |  |
| ST4: Understanding and quantifying the state and variability of the Southern Ocean ecosystems and biodiversity |  |
| KC1: Assess the key drivers of change and their impacts on Southern Ocean ecosystems (food webs and biogeochemical cycling) at circumpolar and regional scales, with emphasis on the effects of changing sea ice conditions on key species (e.g., Antarctic krill, upper trophic level species) |  |
| KC2: Understand Southern Ocean biodiversity at regional and circumpolar, as well as benthic and pelagic scales, by investigating the potential changes occurring from influences of climate change and human activities |  |
| KC3: Evaluate the distribution of species in relation to CCAMLR, MPAs and climate change, considering historical changes and future projections |  |
| KC4: Assess the extent to which the “greening” of the Southern Ocean is changing phytoplankton biodiversity, distribution and abundance, investigating the impact of these changes on CO2 uptake, and zooplankton grazers |  |
| ST2: Understanding and quantifying the state and variability of Southern Ocean air-sea-ice fluxes |  |
| KC1: Increase air-sea flux observations with emphasis on:   * Varying conditions imposed by wind patterns, storms and sea state * Regions and times (winter) of high uncertainty in reanalysis products * Areas covered by sea ice and influenced by polynyas/leads |  |
| KC2: Improve satellite flux capabilities to:   * Develop reliable retrievals of turbulent heat fluxes, especially in high winds and sea state * Improve freshwater flux retrievals for regions with variable ice-induced freshwater inputs |  |
| KC3: Decrease uncertainty in atmosphere and ocean dynamics and boundary-layer thermodynamic processes, aiding improvements in weather and climate models |  |
| KC4: Constrain variability in Southern Ocean carbonate system and ocean-atmosphere CO2 fluxes over seasonal and annual temporal scales |  |
| KC5: Assess the spatial, seasonal and interannual distribution of essential climate variables in the sea ice-impacted Southern Ocean (e.g., the marginal sea ice zone) to decrease uncertainty on air-sea-ice fluxes of biogeochemical and physical properties |  |
| KC6: Evaluate the contribution that seasonal variability of sea ice makes to heat budgets, considering turbulent fluxes at the ocean-atmosphere interface |  |
| KC7: Increase spatial and temporal coverage of assessments measuring the air-sea-ice fluxes of climate relevant gases (other than CO2, e.g., N2O, CH4, DMS, halogens, Isoprene) |  |
| FC1: Observing System Design, Key Variables and Modelling |  |
| FC2: Methods and Standards (including observational technologies, methodologies and best practices) |  |
| FC3: Data Management and Delivery |  |
| FC4: Networks and Coordination |  |

## Length of Working Group\*

Please provide a time frame for how long the proposed working group would run for. Note, proposed CWGs will only be considered for a maximum of 5-year timelines.

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## Working Group Tasks, Outputs and Timelines\*

*All SOOS working groups play an active role in contributing towards SOOS’s Objectives and Deliverables identified in the* [*SOOS 2021-2025 Science and Implementation Plan*](https://soos.aq/images/soos/about_us/DRAFT_ScienceandImplementationPlan2021_2025.pdf)*.*

Please use the table below to add information on the expected tasks, outputs and timeline for your WG.

Please note:

* The tasks of your working group should contribute to at least one of the SOOS objectives (column 1).
* You may find that many tasks deliver against a single Implementation Action (column 2) - this is fine, please use “A. B. C.” to indicate different tasks against the one Implementation Action
* If possible, use A. B. C. to connect the outputs to their relevant task (as in the example provided in the table)
* Leave cells blank that are not relevant to the proposed CWG
* CWGs will predominantly deliver against actions of Objective 1 and 2 but may also deliver against actions in other objectives.
* If you do not see an appropriate place to include a Task, an open text box is provided below the table.

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| **Objective** | **Implementation Actions** | **Tool/**  **mechanism** | **Tasks** | **Externals Programs Involved** | **Output** | **Timing  (e.g., Year 1, all years)** | **Dependencies (e.g., funding)** |
| **Objective 1:**  Develop and coordinate inclusive and collaborative networks for shared knowledge, enhanced observational capability, and data collection, management and delivery | **Regional Networks**  Coordination of regional networks | RWGs  IPO |  |  |  |  |  |
| **Capability Networks**  Coordination of networks to enhance observational capacity | **CWGs**  SSC  TTs  DMSC | 1. *Build and maintain multi-national WG membership*   B.  C. |  | *A. WG Membership*  *A. Regular virtual meetings*  B.  C. |  |  |
| **Network Integration**  Integrate and engage between and across relevant programs, organisations, and institutes to leverage and enhance impact of the SOOS program as a whole | All SOOS groups | A.  B.  C. |  |  |  |  |
| **Data Network**  Build an effective, networked community of data managers | DMSC | A.  B.  C. |  |  |  |  |
| **EDI**  Actively review and reflect on networking processes, activities, and structures to ensure that they are equitable, diverse and inclusive (EDI) | EDI Group  SSC  EXCOM  All SOOS groups | A.  B.  C. |  |  |  |  |
| **Capacity Development**  Build Southern Ocean community capacity, including early career (EC) development and support for new and emerging national programs | All SOOS groups | A.  B.  C. |  |  |  |  |
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| **Objective** | **Implementation Actions** | **Tool/**  **mechanism** | **Tasks** | **Externals** | **Output** | **Metrics** | **Dependencies** |
| **Objective 2:**  Address gaps and inefficiencies in our ability to collect, deliver, and use sustained observations | **Modelling & OSD**  Support and lead efforts to better integrate modelling and observational efforts, including observing system design (OSD) elements such as Observing System Simulation Experiments (OSSEs) and Essential Ocean Variable (EOV) identification | OSD  **CWG**  RWGs | A. |  |  |  |  |
| **Technology and Methods**  Support and lead efforts to advance observing system and data sharing technologies (hardware, software) and methods | **CWGs**  TT  DMSC | A. |  |  |  |  |
| **Best Practice**  Support and lead efforts to agree, document, advocate for and implement best practice, in both science and data | RWGs  **CWGs**  TT  DMSC | A. |  |  |  |  |
| **Gaps and Opportunities**  Identify gaps and opportunities across the foundational capabilities and support efforts to address them | SSC  DMSC  POLDER  **CWGs**  TT | A. |  |  |  |  |
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| **Objective** | **Implementation Actions** | **Tool/**  **mechanism** | **Tasks** | **Externals** | **Output** | **Metrics** | **Dependencies** |
| **Objective 3:**  Identify the spatio-temporal and thematic requirements of observations needed to address the science themes; identify existing coverage and work to maintain it; and address identified gaps. | **Regional Challenges**  Develop a circumpolar understanding of regional importance of Theme Challenges, and national/international efforts to address them | RWGs  DueSouth | A. |  |  |  |  |
| **Stakeholder Requirements**  Develop a circumpolar understanding of stakeholder requirements and priorities for data pertaining to the Theme Challenges | RWGs  IPO  SSC | A. |  |  |  |  |
| **Regional Observations**  Develop and utilise a system for identification of observational coverage and requirements | IPO  RWGs  Airtable  SOOSmap | A. |  |  |  |  |
| **Logistical Collaboration**  Enhance logistical collaborations to ensure sustained data coverage | RWGs  DueSouth | A. |  |  |  |  |
| **Advocacy**  Support and advocate for efforts to collect, deliver or use observational data | All SOOS groups | A. |  |  |  |  |
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| **Objective** | **Implementation Actions** | **Tool/**  **mechanism** | **Tasks** | **Externals** | **Output** | **Metrics** | **Dependencies** |
| **Objective 4:**  Deliver high-quality scientific data, synthesis activities/products and knowledge that are needed to deliver our mission | **Publications**  Delivery of publications (scientific, strategic, data) that provide scientific knowledge towards addressing the Science Themes, enhancing observational capabilities, or delivering directly to policy and management | RWGs  **CWGs**  TTs  SSC  SOOSmap  POLDER | A. |  |  |  |  |
| **SOOSmap**  Populate SOOSmap with high-priority standardised datasets that are required to address the Science Themes and encourage broader use of SOOSmap by Southern Ocean researchers | RWGs  **CWGs**  DMSC | A. |  |  |  |  |
| **FAIR Data**  Enhance FAIR data management and delivery through use and linkage of existing tools and networks, and assist in connecting resources to needs | DMSC  POLDER | A. |  |  |  |  |
| **Data Policy**  Ensure SOOS data activities align with a clear data policy that is itself, aligned with the FAIR data principles of being Findable, Accessible, Interoperable and Reusable and with data policy of other polar communities | DMSC | A. |  |  |  |  |
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| **Objective** | **Implementation Actions** | **Tool/**  **mechanism** | **Tasks** | **Externals** | **Output** | **Metrics** | **Dependencies** |
| **Objective 5:**  Maintain SOOS as the world-leading hub to support the collection and delivery of Southern Ocean observations | **Impact Metrics**  Reporting metrics and information are collected, compiled and delivered to Stakeholders as required | IPO, all SOOS groups | A. |  |  |  |  |
| **Communication Strategy**  The SOOS communication and engagement strategy is kept up-to-date and implemented | IPO and all SOOS groups | A. |  |  |  |  |
| **IPO Funding**  Funding for the SOOS IPO is maintained and enhanced | IPO and ExCom | A. |  |  |  |  |
| **Governance**  SOOS Governance is managed and maintained | IPO, All SOOS groups | A. |  |  |  |  |
| **Objectives Coordinated**  Implementation Plan Objectives are coordinated and supported | IPO, SSC and ExCom | A. |  |  |  |  |
| **IPO Administration**  SOOS IPO administration and management is carried out efficiently and effectively | IPO  ExCom  Host Institute | A. |  |  |  |  |

*\* IPO = SOOS International Project Office, EXCOM = SOOS Executive Committee, SSC = SOOS Scientific Steering Committee, DMSC = SOOS Data Management sub-Committee, RWGs = SOOS Regional Working Groups, CWGs = SOOS Capability Working Groups, TTs = SOOS Task Teams*

Please outline below any tasks not encompassed by the SOOS objectives and implementation actions above.

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## IPO Support

Please indicate if the proposed CWG requests any specific support from the IPO

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## Additional Information

Please add any additional information on the proposed CWG relevant which is not captured in any of the sections above.

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