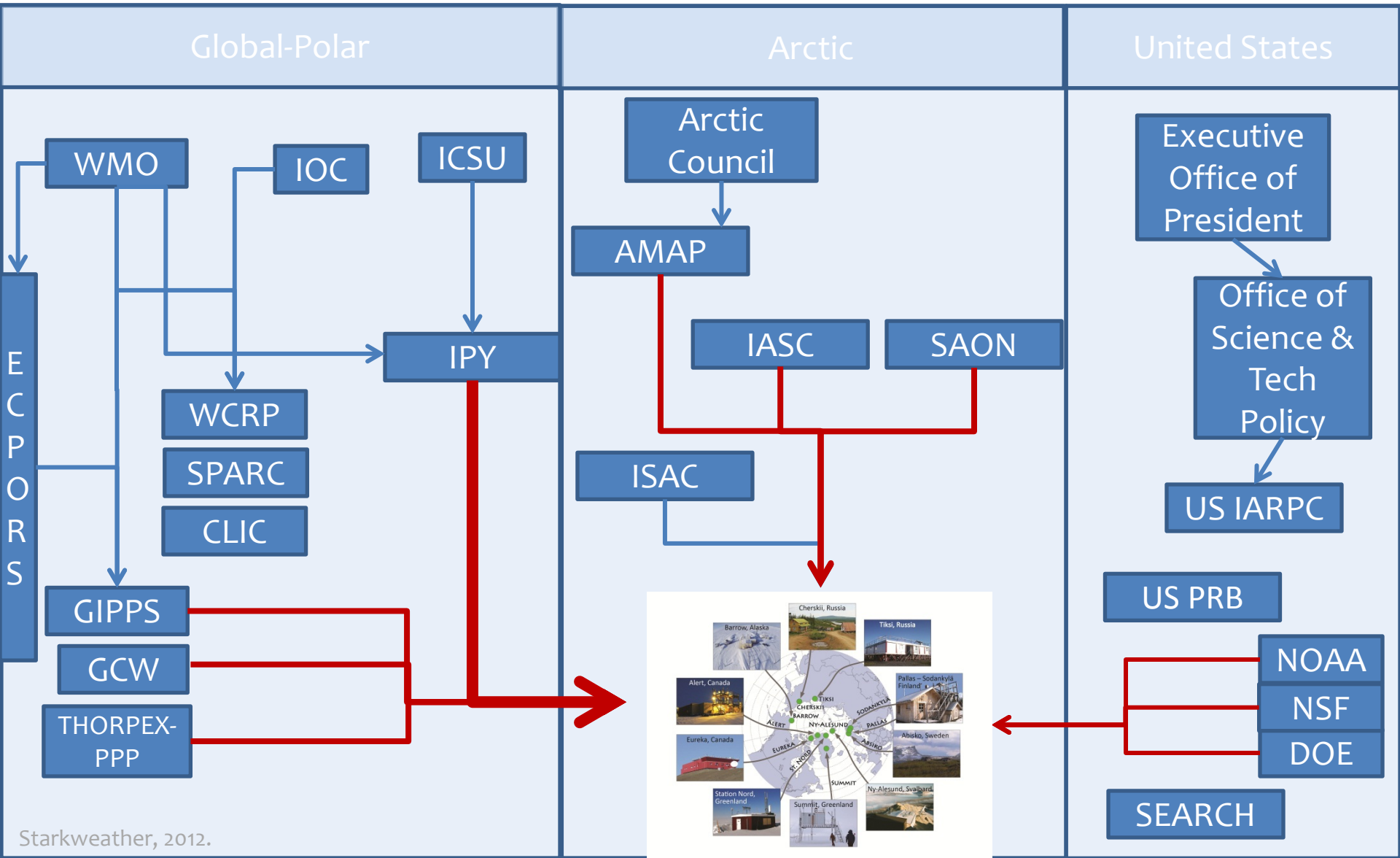
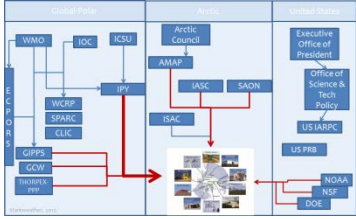
IASOA Organization Linkages



Starkweather, 2012.

ICSU
International Council for Science



The International Council for Science (ICSU) is a non-governmental organisation with a global membership of national scientific bodies (120 Members, representing 140 countries) and International Scientific Unions (31 Members).

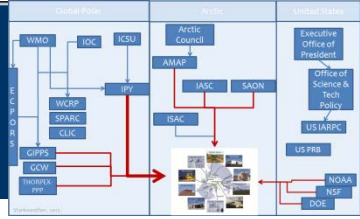
Our mission

ICSU's mission is to strengthen international science for the benefit of society. To do this, ICSU mobilizes the knowledge and resources of the international science community to:

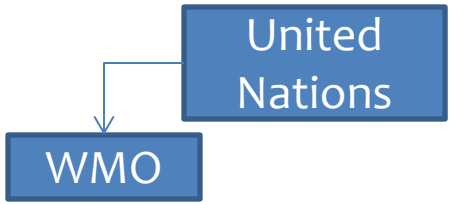
- Identify and address major issues of importance to science and society.
- Facilitate interaction amongst scientists across all disciplines and from all countries.
- Promote the participation of all scientists—regardless of race, citizenship, language, political stance, or gender—in the international scientific endeavour.
- Provide independent, authoritative advice to stimulate constructive dialogue between the scientific community and governments, civil society, and the private sector.

World Meteorological Organization

Working together in weather, climate and water



The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources.



WMO scientific and technical programmes

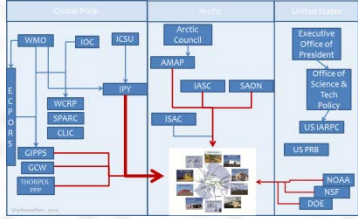
- World Weather Watch (WWW) Programme
- World Climate Programme (WCP)
- Global Atmosphere Watch Programme (GAW)
- World Weather Research Programme (WWRP)
- Applications of Meteorology Programme (AMP)
- Hydrology and Water Resources Programme (HWRP)
- Education and Training Programme (ETRP)
- Technical Cooperation Programme (TCOP)

Co-sponsored programmes

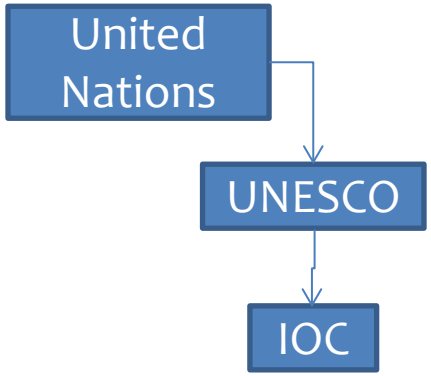
- Intergovernmental Panel on Climate Change (IPCC)
- World Climate Research Programme (WCRP)
- Global Climate Observing System (GCOS)
- Global Ocean Observing System (GOOS)
- Global Terrestrial Observing System (GTOS)

Intergovernmental Oceanographic Commission

RESOURCES, MEETINGS, DOCUMENTS, PEOPLE

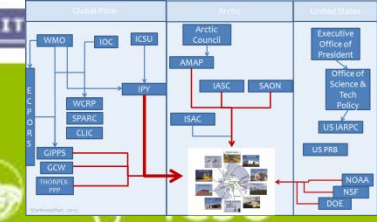


Founded in 1960 by the UNESCO General Assembly, the IOC celebrates its 50th Anniversary throughout 2010 and 2011. UNESCO's Intergovernmental Oceanographic Commission (IOC) promotes international cooperation and coordinates programmes in marine research, services, observation systems, hazard mitigation, and capacity development in order to understand and effectively manage the resources of the ocean and coastal areas.

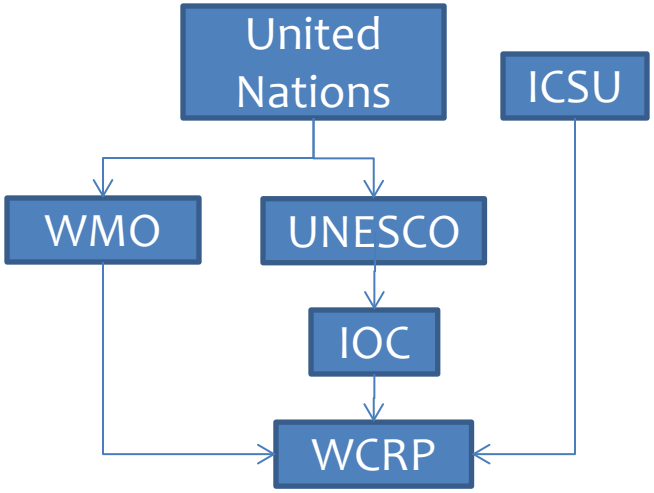


The IOC Mission...

- IOC aims to improve the governance, management, institutional capacity, and decision-making processes of its Member States with respect to marine resources and climate variability and to foster sustainable development of the marine environment, in particular in developing countries.
- IOC coordinates ocean observation and monitoring through the Global Ocean Observing System (GOOS) which aims to develop a unified network providing information and data exchange on the physical, chemical, and biological aspects of the ocean. GOOS serves as the ocean component of the Global Climate Observing System (GCOS), which supports the Intergovernmental Panel on Climate Change (IPCC).



The World Climate Research Programme is sponsored by the World Meteorological Organization (WMO), the International Council for Science (ICSU) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO.

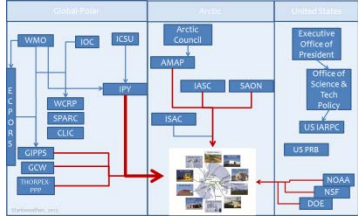


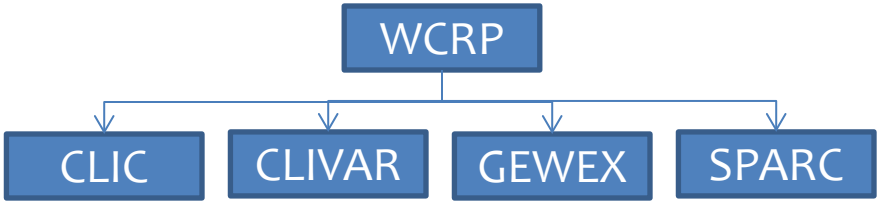
The WCRP Mission…

… is to facilitate analysis and prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit and value to society. The two overarching objectives of the WCRP are:

1) ***to determine the predictability of climate***; and

2) ***to determine the effect of human activities on climate***





WCRP Core Projects:

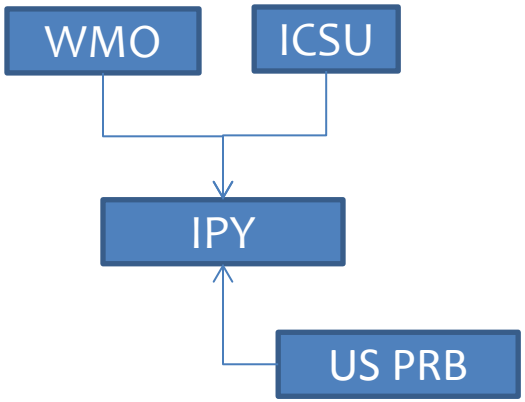
Climate and Cryosphere (CliC): The principal goal of CliC is to assess and quantify the impacts of climatic variability and change on components of the cryosphere and their consequences for the climate system, and to determine the stability of the global cryosphere.

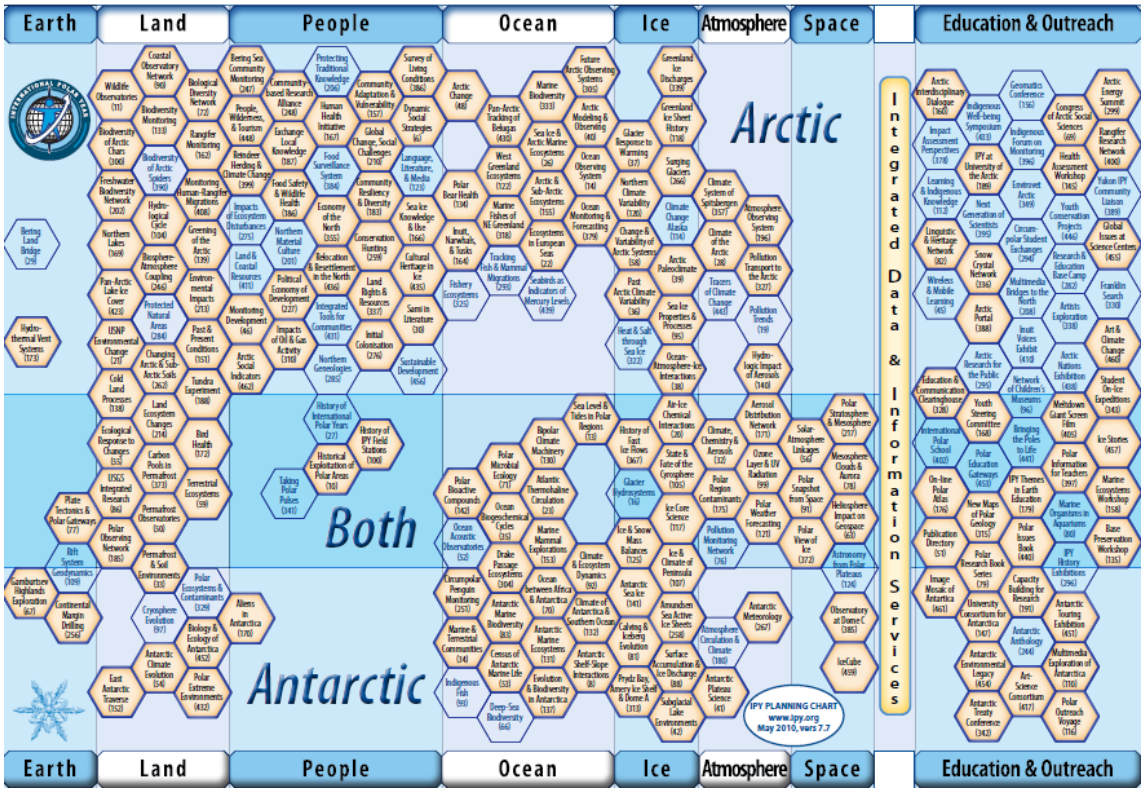
Climate Variability and Predictability (CLIVAR): CLIVAR's mission is to observe, simulate, and predict the Earth's climate system with a focus on ocean-atmosphere interactions in order to better understand climate variability, predictability and change.

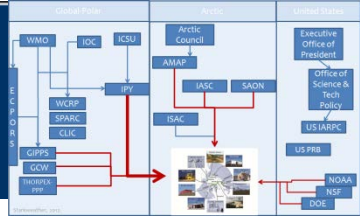
Global Energy and Water Cycle Experiment (GEWEX): GEWEX focuses on the atmospheric and thermodynamic processes that determine the global and regional hydrological cycle, radiation and energy transitions and their involvement in global changes such as increases in greenhouse gases.

Stratospheric Processes And their Role in Climate (SPARC): SPARC has as its principal focus research on the significant role played by stratospheric processes in the Earth's climate, with a particular emphasis on the interaction between chemistry and climate.

The International Polar Year is a large scientific programme focused on the Arctic and the Antarctic from March 2007 to March 2009. IPY, organized through the International Council for Science (ICSU) and the World Meteorological Organization (WMO). U.S. Participation was coordinated through the U.S. Polar Research Board.



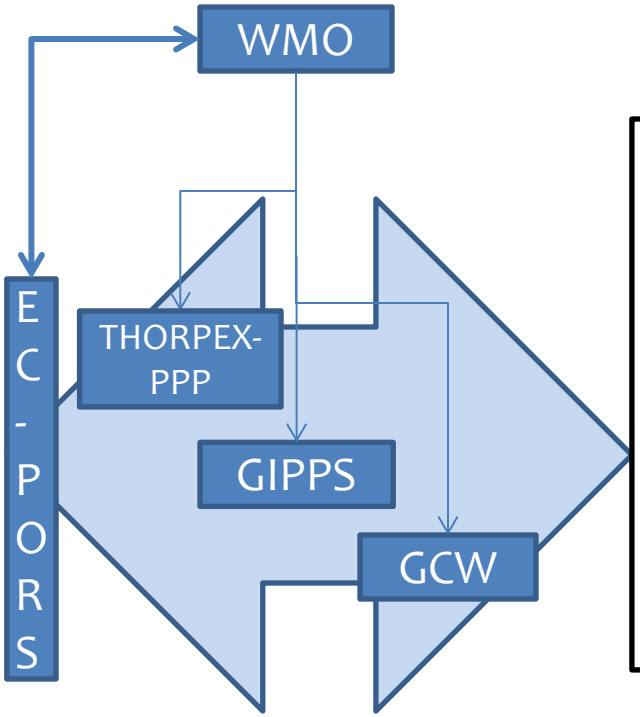




WMO-ECPORS, est. 2008

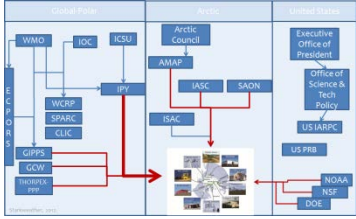
Expert Council-Panel of Experts on Polar Observations, Research and Services

Cross-cutting activity of WMO that interfaces with all polar programs



- Entry point to all WMO Programmes and to external partners seeking to collaborate with WMO on polar activities
- Aim is to bring observations, research and services together allowing WMO to maximize the value of its and its partners' investments in Polar Regions

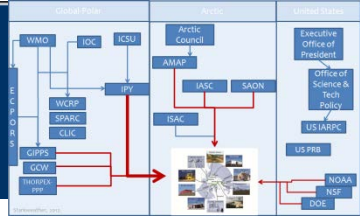
Starkweather, 2011.



EC-PORS – Technical Commissions

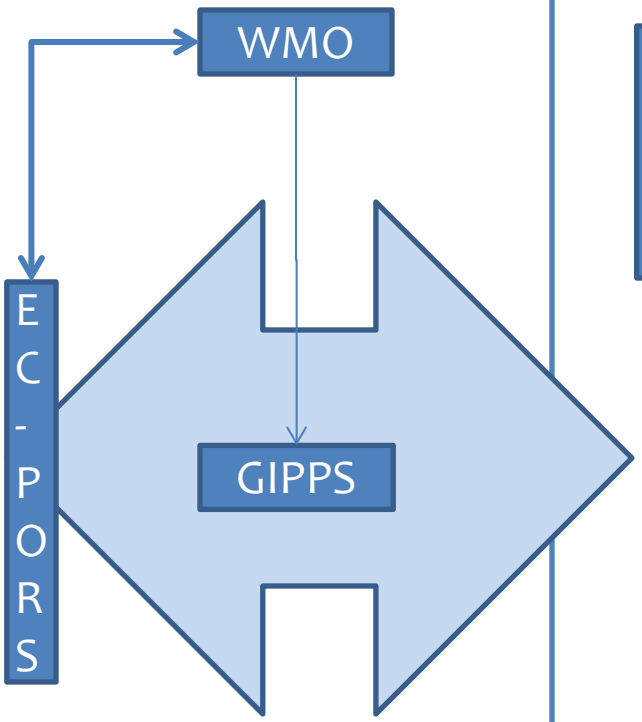
Working Together for improved Polar Observations, Research, Services

- "Services" are the driver that anchors the Panel's work
  - Transportation, Search and Rescue, Polar Climate Outlook Forums
- Strengthen the interface with users including research community, northern peoples, economic sectors (*all TCs*)
- Contribute to the Global Framework for Climate Services – Polar Regional Climate Centres (especially, *CCl, CBS*)
- Polar Prediction – a decadal undertaking, requiring active involvement of WMO Programmes, co-sponsored programmes and technical commissions (especially, *CAS, WCRP*)
- Observations - Need to position WMO to influence and sustain observing systems, e.g SAON (*all)*
- Facilitate integration and coordination between IPY legacy initiatives and WMO observing systems and programs (all)
- Implementation of a Global Cryosphere Watch *(all)*



Global Integrated Polar Prediction System (GIPPS)

EC-PORS, Decadal Initiative



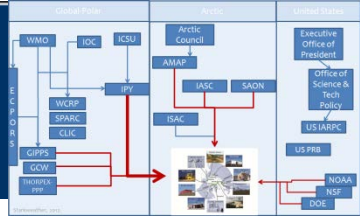
Modes
- Observations
- Research
- Services

Regions
- Arctic
- Antarctic
- Himalaya & Tibetan Plateau

Time Scales
- Short (days to weeks, deterministic)
- Medium (months to decades, ensemble)
- Long (century, IPCC-scenario)

System Focus
- Synoptic
- Polar clouds
- Surface (sea ice, permafrost, ice sheet mass balance, snow cover, etc.)

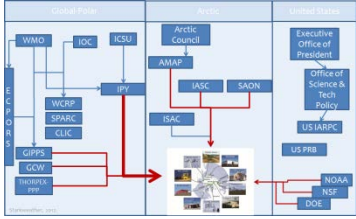
Starkweather, 2011.



Research Framework: GIPPS

- EC-PORS agreed to the concept to develop a major decadal initiative entitled the **Global Integrated Polar Prediction System (GIPPS)** which, for Polar areas, would become a foundation of delivering WMO's substantial contribution to *"the protection of life and property against natural disasters, to safeguarding the environment and to enhancing the economic and social well-being of all sectors of society in areas such as food security, water resources and transport."*
- 'Polar Prediction System' will need to be an end-to-end, fully supported, operational prediction system, from hours to centuries
- EC-PORS Research Task Team conducted an initial 'gap analysis' concerning perceived service/observational/modelling deficiencies mainly in current polar prediction systems; this will be expanded through Services White Paper
- Partnerships will be critical – Technical commissions, AMPS, AMOMWF, SCAR, IASC, ICPM, WMO Global Producing Centres (e.g. ECMWF, NCEP)
- Essential engagement of major research programs and activities, notably
  - WWRP-THORPEX Polar Prediction
  - WCRP – Predictability of Polar climate

GLOBAL CRYOSPHERE WATCH (GCW): A WMO Initiative – an IPY Legacy



observation, monitoring, assessment, product development, research through to prediction

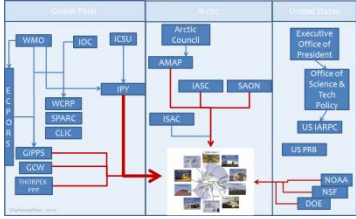
Mission:

To meet the needs of WMO Members and partners in delivering services to users, the media, public, decision and policy makers, GCW will provide authoritative, understandable, and useable data, information, and analyses on the past, current and future state of the cryosphere.

- GCW will build upon and serve as an international mechanism for implementing the recommendations of the Integrated Global Observing Strategy (IGOS) - Cryosphere Theme ("CryOS")
- GCW is a crosscutting activity contributing to all five priority areas and to achieving the expected results of all Strategic Thrusts of the WMO Strategic Plan 2012-2015
- GCW will be an essential component of WIGOS and will strengthen the WMO contribution to the GFCS
- GCW cuts across all the WMO technical departments, joint sponsored activities, and WMO Technical Commissions
- Currently, over 30 Members from all WMO Regions have nominated GCW focal points to be involved in the development of GCW globally and nationally

Partnering with technical commissions is essential

Conceptual Framework for GCW Operation



WMO, Co-sponsors, Partners

GCW Advisory Committee

GCW Expert, Technical, & Regional Teams

Mission

Provide authoritative, clear, and useable data, information and analyses on the past, current and future state of the cryosphere to meet the needs of WMO Members and partners in delivering services to users.

Users & Applications

research, operational centres, security, impacts, adaptation

Outreach, Education, Capacity Building

Data and Information

GCW Portal

GCW Information and Analysis

anomaly tracking, hot-spots, variability and change (past, present, future), global and regional products, reference station data

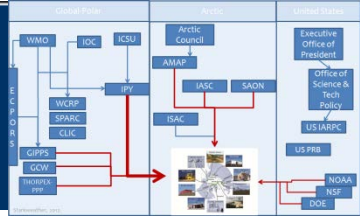
Observations

GCW stations, contributing networks, satellites

Cryosphere Products

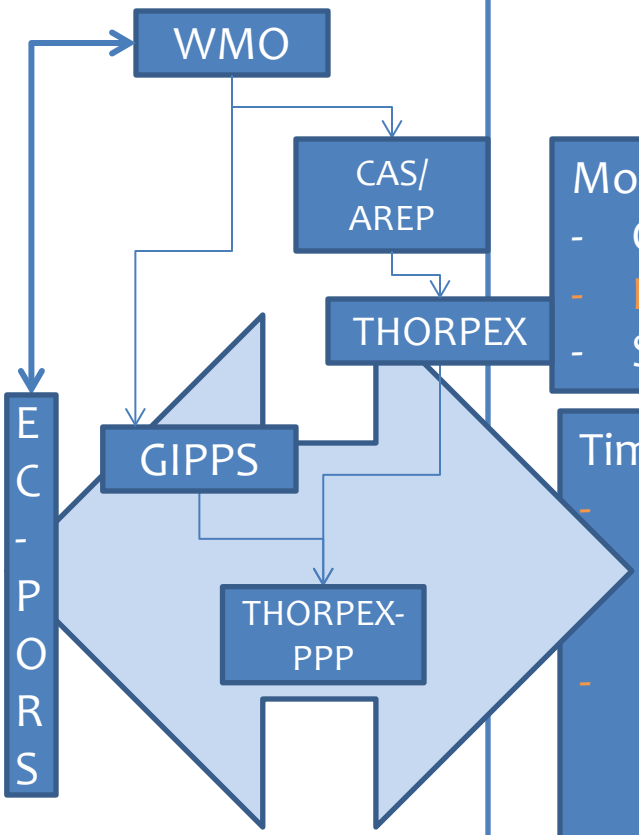
operational products, reanalyses, research datasets

World Meteorological Organization
Working together in weather, climate and water



The Observing System Research and Predictability Experiment

THORPEX-PPP contributions to GIPPS



Modes
- Observations
- Research
- Services

Regions
- Arctic
- Antarctic
- Himalaya & Tibetan Plateau

Time Scales
- Short (days to weeks, deterministic)
- Medium (months to decades, ensemble)
- Long (century, IPCC-scenario)

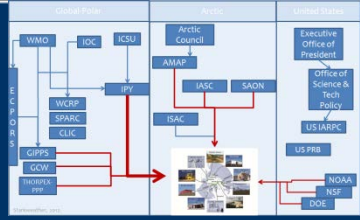
Outcomes
- Improved services: transport; logistics & planning; bio & energy resources; etc.
- Improved understanding of key physical processes; improve obs tech & approach
- Providing input to global models to ensure that polar processes are captured

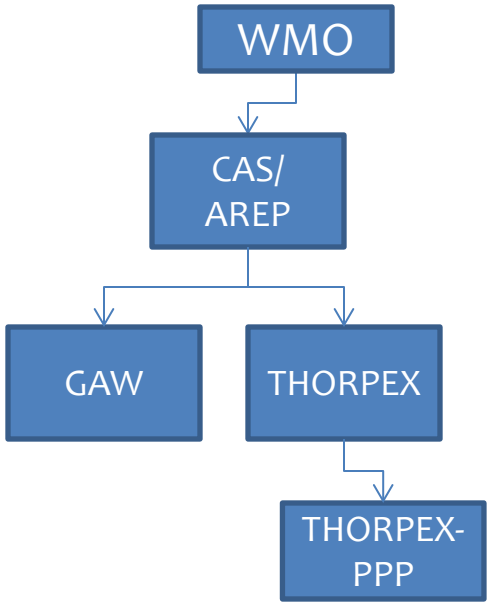
From THORPEX-PPP Mission Statement: "This constitutes the hourly to seasonal research component of the WMO GIPPS"

Starkweather, 2011.

World Meteorological Organization

Working together in weather, climate and water





World Weather Research Programme (WWRP)

Programmes > WWRP >

The Observing System Research and Predictability Experiment (THORPEX)

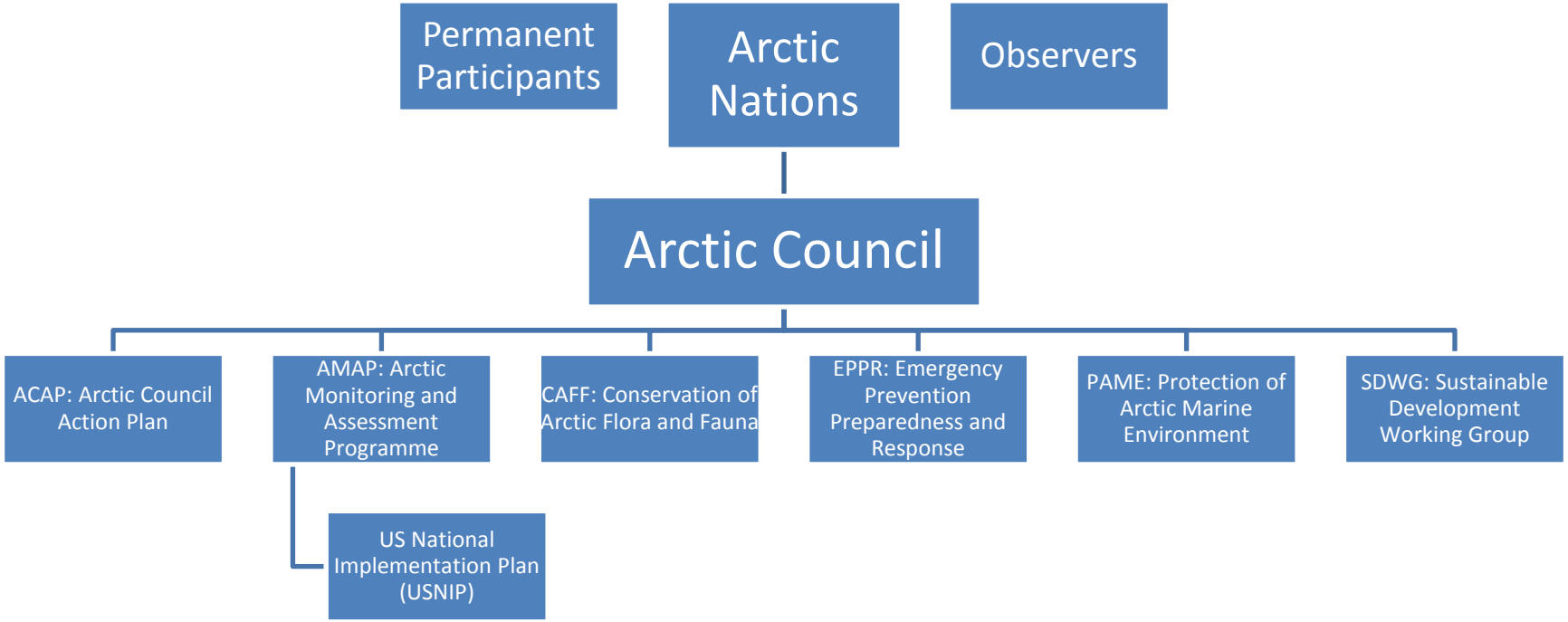
THORPEX
A World Weather Research Programme

MISSION

THORPEX is a 10-year international research and development programme to accelerate improvements in the accuracy of one-day to two-week high impact weather forecasts for the benefit of society, the economy and the environment.

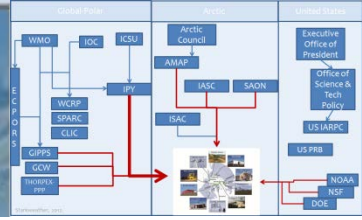
THORPEX establishes an organizational framework that addresses weather research and forecast problems whose solutions will be accelerated through international collaboration among academic institutions, operational forecast centres and users of forecast products.

The Ottawa Declaration of 1996 formally established the Arctic Council as a high level intergovernmental forum to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic.



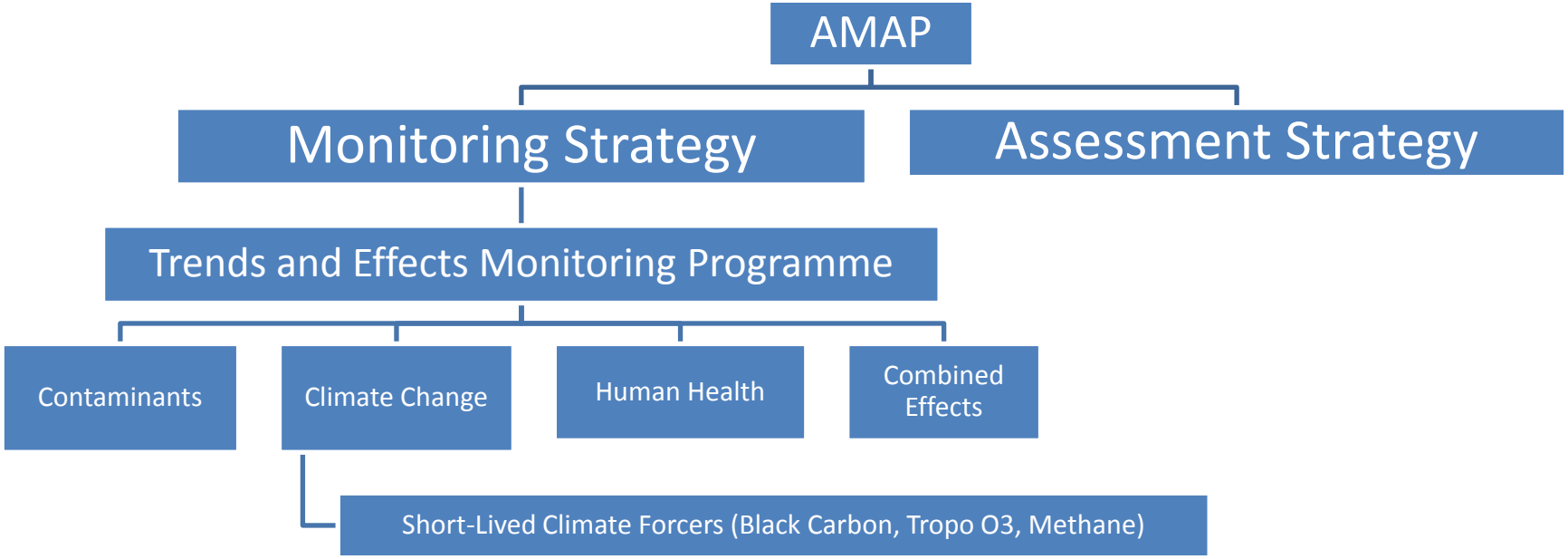
AMAP

Arctic Monitoring and Assessment Programme



AMAP is an international organization established in 1991 to implement components of the Arctic Environmental Protection Strategy (AEPS).

Now a programme group of the Arctic Council, AMAP's current objective is *"providing reliable and sufficient information on the status of, and threats to, the Arctic environment, and providing scientific advice on actions to be taken in order to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants".*



The International Arctic Science Committee, is a non-governmental organization that aims to encourage, facilitate and promote cooperation in all aspects of Arctic research in all countries engaged in Arctic research and in all areas of the Arctic region

Arctic Council

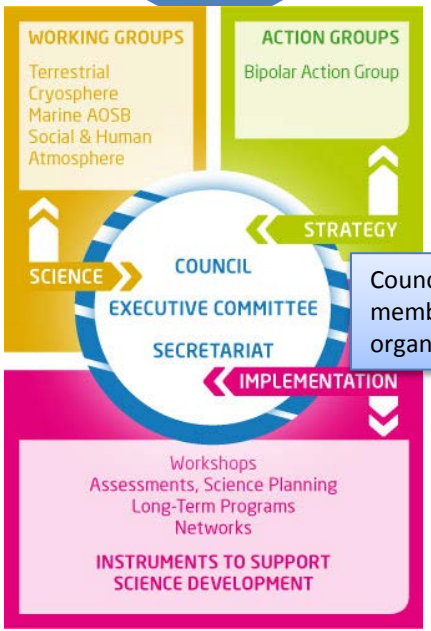
ICSU

Observer Status on Arctic Council

IASC

International Scientific Associate of ICSU

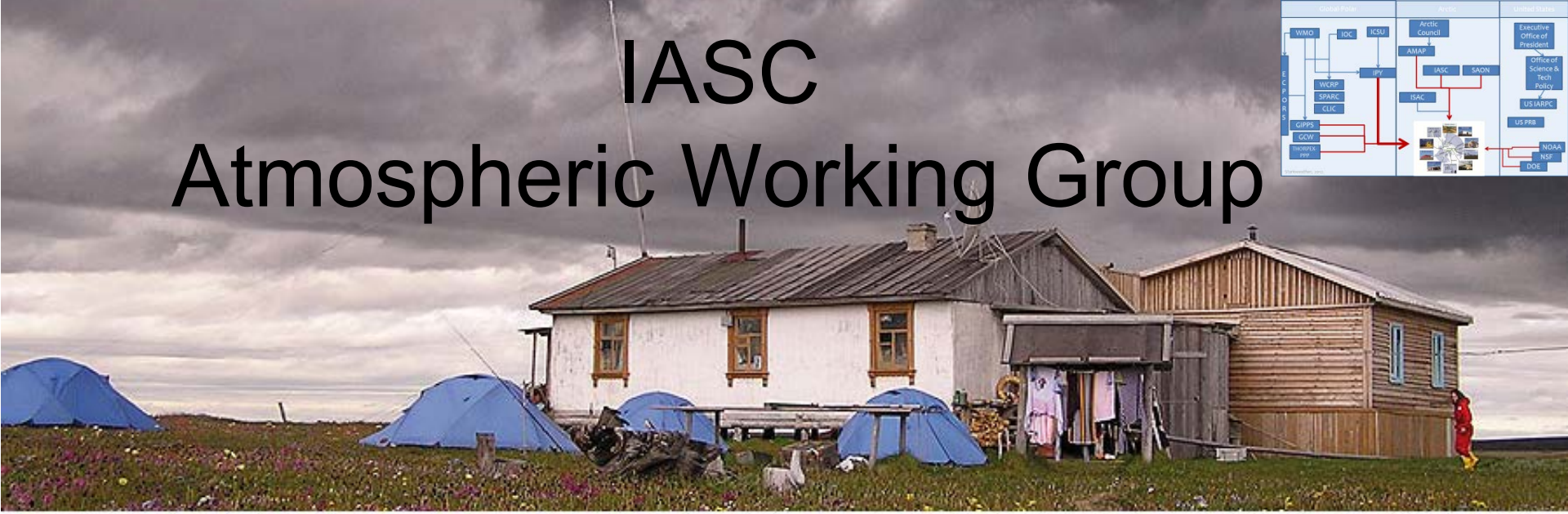
The scientific scope of the Atmosphere Working Group includes scientific research towards understanding and prediction of Arctic change, and considering the fate of perennial sea ice and the global atmospheric consequences of its disappearance. This includes past climate states, investigation of Arctic processes across data sets and approaches, and climate model projections. The scope includes local and regional impacts of Arctic change.
The geographic scope of the Atmosphere Working Group shall be the Arctic but will also include the Arctic´s responses to global change processes (arctic amplification) and impacts of Arctic changes on the northern hemisphere atmospheric circulation.



Council composed of members of science organizations from:

- Canada
- China
- Denmark/Greenland
- Finland
- France
- Germany
- Iceland
- Italy
- Japan
- The Netherlands
- Norway
- Poland
- Russia
- Republic of Korea
- Spain
- Sweden
- Switzerland
- United Kingdom
- USA

IASC
Atmospheric Working Group



SCIENTIFIC FOCI

The Atmosphere WG will address many of the direct large scale and regional climate change issues for IASC. We see our function as promoting science, but not focusing on monitoring or future assessments.

Support for increased tropospheric observations

The Atmosphere Working Group supports the integrated Arctic Ocean Observing System (iAOOS) concept of 10-20 drifting ocean/sea ice buoys. Specifically, engineering work is needed to add atmospheric radiation and temperature profiling capability to the drifting buoy plans for iAOOS.

We hope that this action can be conducted jointly with the Marine and perhaps Cryosphere WGs of IASC with IASC support for joint projects. We will also supply moral support to SAON and ISAC activities, as well as other observational coordination efforts.

Perceptions and Representations of Arctic Change

The Atmosphere WG wants to promote joint work of the IASC Atmosphere and Social & Human Sciences WGs on this topic. The IASC Social & Human Sciences WG will be identifying the best social scientists for this topic in the next months and are planning a roundtable discussion about it at their meeting at ICASS VII in Akureyri in late June. After that, they will be ready for joint activities. A joint session at 2012 ASSW maybe a possible forum.

US NAS

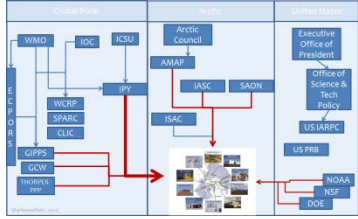
The National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council are private, nonprofit institutions that provide expert advice on some of the most pressing challenges facing the nation and the world.

Known collectively as the National Academies, our organization produces groundbreaking reports that have helped shape sound policies, inform public opinion, and advance the pursuit of science, engineering, and medicine.

To meet the government's urgent need for an independent adviser on scientific matters, President Lincoln signed a congressional charter forming the National Academy of Sciences in 1863 to "investigate, examine, experiment, and report upon any subject of science." As science began to play an ever-increasing role in national priorities and public life, the National Academy of Sciences eventually expanded to include the National Research Council in 1916, the National Academy of Engineering in 1964, and the Institute of Medicine in 1970.

Polar Research Board

DIVISION ON EARTH & LIFE STUDIES



US NAS

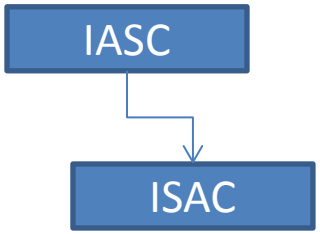
US PRB

Part of the US National Acadamies, the PRB exists to promote excellence in polar science and to provide independent scientific guidance to federal agencies and the nation on science issues in the Arctic, the Antarctic, and cold regions in general.

The PRB program has two elements: a core element and a study element. Under its core element, the PRB serves as a source of information and assistance to federal agencies, Congress, and others in the polar community. The PRB is unique in its coverage of both Arctic and Antarctic science, and attempts to foster improved coordination between research at both poles… It is also the U.S. National Committee for the International Arctic Science Committee (IASC). Although nongovernmental in nature, both SCAR and IASC have important international advisory roles to ministerial level organizations and meetings. SCAR provides advice to and participates actively in meetings of the Antarctic Treaty Consultative Parties. IASC attends meetings of the Arctic Environmental Ministers, Senior Arctic Affairs Officials, and new Arctic Council.

The PRB also served as the U.S. National Committee for International Polar Year 2007-2008, helping to initiate this global program and continuing a role in disseminating and synthesizing the information generated.

International Study of Arctic Change ~ "International SEARCH"
ISAC was initiated by IASC to develop science direction



Mission

ISAC provides a *scientific and organizational framework* focused around nine key science questions for pan-Arctic scale research including *long-term planning and priority setting.*

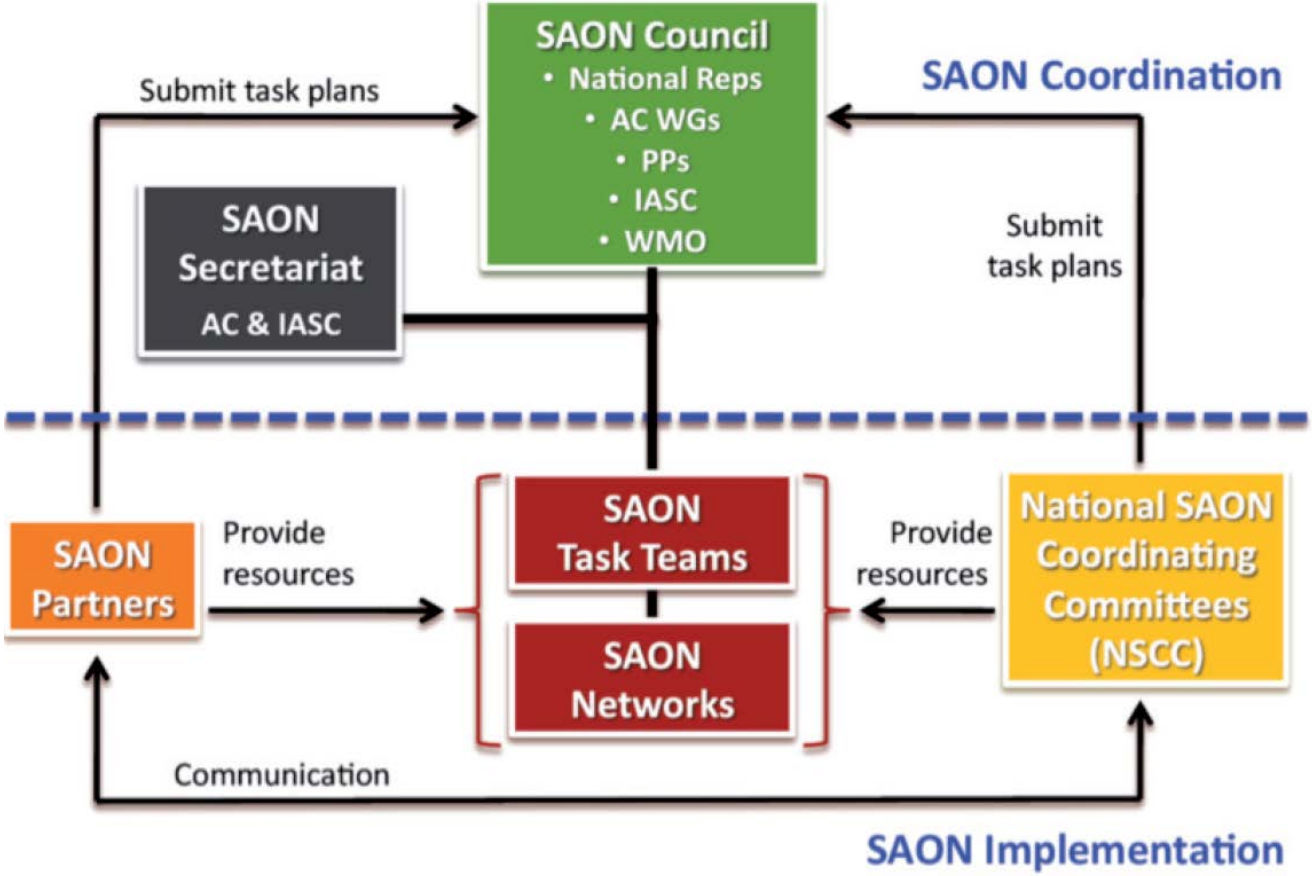
ISAC promotes *observations, synthesis, and modeling activities to provide an Integrated understanding* of the past, present and future arctic environment *needed for responding to change*.

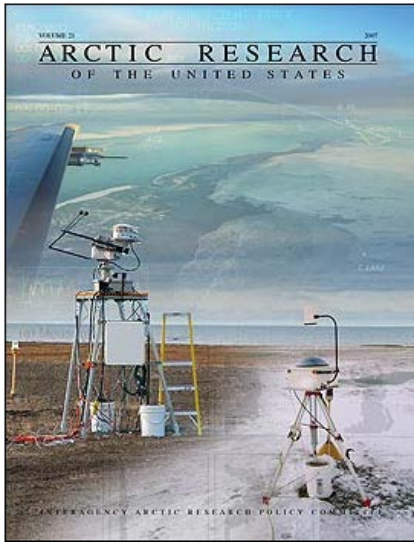
ISAC, in collaboration with partner organizations, provides authoritative and timely *scientific information to stakeholders and decision makers for responding to rapid arctic environmental change*.

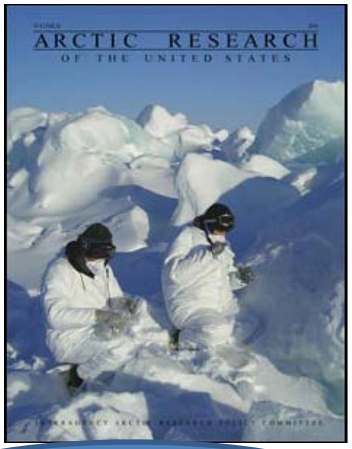
ISAC establishes new and enhances existing *synergies among scientists and stakeholders* engaged in arctic environmental research and governance.

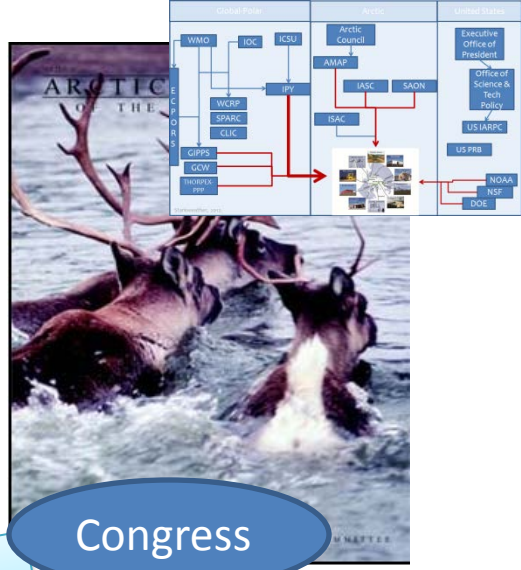
ISAC fosters *links* between arctic environmental change initiatives and relevant *global programs*.

The Goal of SAON is to enhance Arctic-wide observing activities by facilitating partnerships and synergies among existing observing and data networks ("building blocks"), and promoting sharing and synthesis of data and information.









White House

OSTP

OMB

Congress

Appoints Commissioners

Integrates ARP w/ Federal priorities & resources

Provide President's Budget to Congress

Agency Funding

Consolidates input from stakeholders, including extramural research community

US ARC

Sets Priorities

IARPC

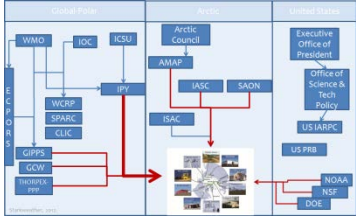
Creates Arctic Research Plan (ARP)

Federal Agencies

Implement the Plan

Starkweather, 2011.

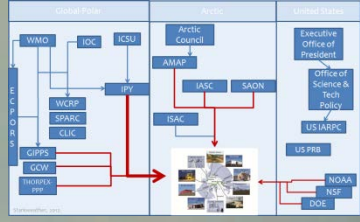
U.S. Arctic Research Policy Act created the Interagency Arctic Research Policy Committee (IARPC). IARPC's prime responsibility is the creation of one coherent Federal Arctic Research Plan and budget to address Federal research priorities in the Arctic. It is updated bi-annually.



Executive Office –
Relevant Climate Research/Arctic Resources

- Executive Office of the President (whitehouse.gov)
  - Office of Science & Technology Policy (OSTP)
    - COMMITTEE ON ENVIRONMENT & NATURAL RESOURCES
      - AIR QUALITY RESEARCH (SC)
      - GLOBAL CHANGE RESEARCH/ CLIMATE CHANGE SCIENCE (SC)
      - US GROUP ON EARTH OBSERVATIONS (SC)
      - DISASTER REDUCTION (SC)
      - OCEAN SCIENCE & TECHNOLOGY (SC)
      - WATER AVAILABILITY & QUALITY (SC)
      - ECOLOGICAL SYSTEMS (SC)
      - TOXICS AND RISK (SC)
    - COMMITTEE ON HOMELAND & NATIONAL SECURITY
      - DECONTAMINATION STANDARDS & TECHNOLOGY (SC)
      - FOREIGN ANIMAL DISEASE THREAT (SC)
      - NUCLEAR DEFENSE RESEARCH & DEVELOPMENT (SC)
      - DOMESTIC IMPROVISED EXPLOSIVE DEVICES (SC)
      - HUMAN FACTORS (SC)
      - STANDARDS (SC)
      - ELECTRIC GRID VULNERABILITY (IWG)
      - INFRASTRUCTURE (SC)
    - COMMITTEE ON SCIENCE
      - AQUACULTURE (SC)
      - HUMAN SUBJECTS RESEARCH (SC)
      - PRION SCIENCE (IWG)
      - BIOTECHNOLOGY (SC)
      - LARGE SCALE SCIENCE (SC)
      - RESEARCH BUSINESS MODELS (SC)
      - DIGITAL DATA (IWG)
      - PHYSICS OF THE UNIVERSE (IWG)
      - SCIENTIFIC COLLECTIONS (IWG)
      - DOMESTIC ANIMAL GENOMICS (IWG)
      - PLANT GENOMES (IWG)
      - SOCIAL, BEHAVIORAL, ECONOMIC SCIENCES (SC)
      - EDUCATION & WORKFORCE DEVELOPMENT (SC)
    - COMMITTEE ON TECHNOLOGY
      - AERONAUTICS (SC)
      - INNOVATION & COMPETITIVENESS (SC)
      - SIMULATION_BASED SCIENCE (FTAC)
      - BIOMETRICS & IDENTITY MANAGEMENT (SC)
      - NANOSCALE SCIENCE ENGINEERING & TECH. (SC)
      - SMART GRID (SC)
      - BROADBAND (SC)
      - NETWORKING & INFORMATION TECHNOLOGY (SC)
      - STANDARDS (SC)
      - BUILDINGS TECHNOLOGY RESEARCH & DEV. (SC)
      - INFORMATION PRIVACY (SC)
      - TELEJOBS (FTAC)
      - HYDROGEN & FUEL CELLS (IWG)
      - QUANTUM INFORMATION SCIENCE (SC)

July 2010
  - Council on Environmental Quality (CEQ)
    - Interagency Ocean Policy Task Force
    - Climate Change Adaptation Task Force
  - Office of Management and Budget (OMB)



NOAA's ARCTIC VISION and STRATEGY

NOAA Arctic Strategy Vision:

- Conservation, management, and use are based on sound science and support healthy, productive, and resilient communities and ecosystems; and
- The global implications of Arctic change are better understood and predicted

NOAA Arctic Goals

- Forecast Sea Ice
- Strengthen Foundational Science to Understand & Detect Arctic Climate & Ecosystem Change
- Improve Weather and Water Forecasts and Warnings
- Enhance International & National Partnerships

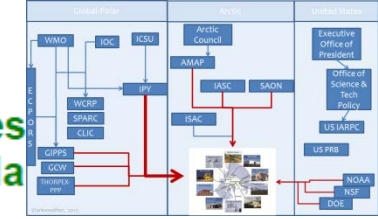
- The Division of Arctic Sciences in the Office of Polar Programs (OPP) supports scientific research in the Arctic, related research, and operational support. Science programs include disciplinary, multidisciplinary, and broad, interdisciplinary investigations directed toward both the Arctic as a region of special scientific interest and a region important to global systems.

- Because the Arctic is the homeland of numerous Native peoples, special attention must be given to all aspects of research and education that may potentially impact their lives.

- NSF is among the agencies contributing to SEARCH, which is also gaining support as a major international effort as the International Study of Arctic Change (ISAC). The Division of Arctic Sciences has funded components of SEARCH research through special announcements of opportunity and expects to continue supporting the development of SEARCH through this mechanism.

U.S. DEPARTMENT OF ENERGY

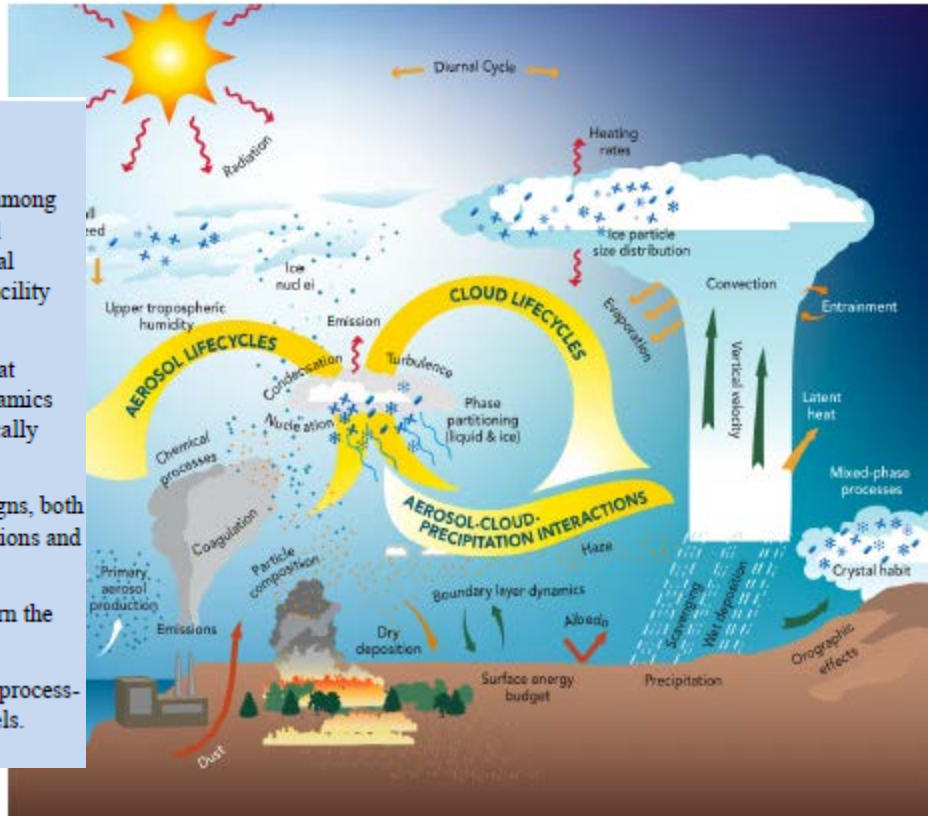
Atmospheric System Res
Science and Program Pla



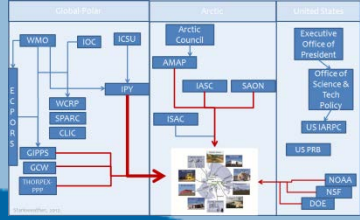
Mission and Objectives

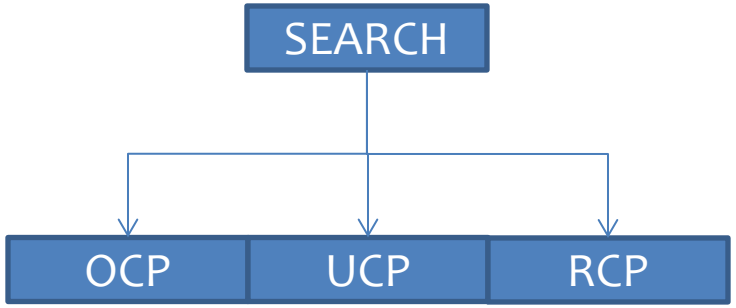
The goal of ASR, in partnership with the enhanced ARM Facility, is to quantify the interactions among aerosols, clouds, precipitation, radiation, dynamics, and thermodynamics to improve fundamental process-level understanding, with the ultimate goal to reduce the uncertainty in global and regional climate simulations and projections. To accomplish this goal, the ASR program and the ARM Facility will:

- Maintain and augment the collection of comprehensive and continuous long-term data sets that provide measurements of radiation, aerosols, clouds, precipitation, dynamics, and thermodynamics over a range of environmental conditions at several fixed and mobile sites situated in climatically diverse locations.
- Supplement the long-term data sets with laboratory studies and shorter-duration field campaigns, both ground-based and airborne, to target specific atmospheric processes under a diversity of locations and atmospheric conditions.
- Use these data, together with models, to understand and parameterize the processes that govern the atmospheric components and their interactions over all pertinent scales.
- Develop integrated, scale-bridging testbeds for model parameterizations that incorporate this process-level understanding of the life cycles of aerosols, clouds, and precipitation in numerical models.



STUDY OF ENVIRONMENTAL ARCTIC CHANGE





SEARCH originated from within the science community. It seeks input for science direction from 3 expert panels (OCP, UCP and RCP) and works through the Interagency Program Management Committee (an IRARPC sub-committee) to develop interagency support for SEARCH goals and objectives.

What's SEARCH?

SEARCH is an interagency effort to understand the nature, extent, and future development of the system-scale change presently seen in the Arctic. These changes are occurring across terrestrial, oceanic, atmospheric and human systems, including:

- increased air temperatures over most of the Arctic;
- changing ocean circulation and rising coastal sea level;
- reduced sea ice cover; and
- thawing permafrost.