

SCAR Scientific Research Programs

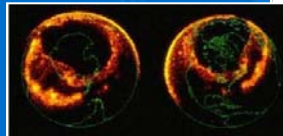
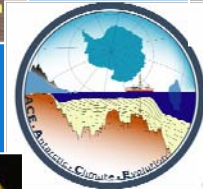


AGCS

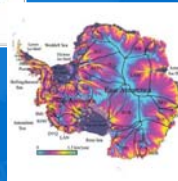
ACE



EBA



ICESTAR

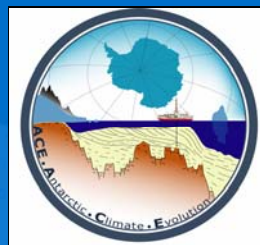


SALE



Scientific Committee on Antarctic Research

Antarctic Climate Evolution (ACE)



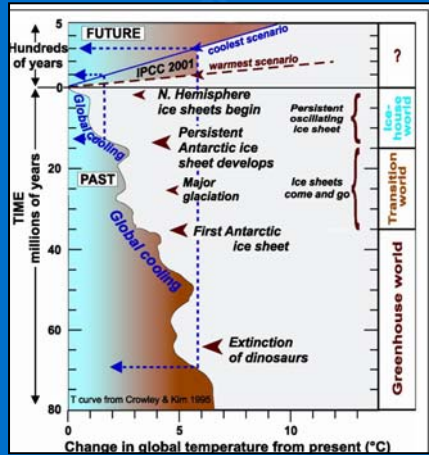
“An international research initiative to study the climate and glacial history of Antarctica through palaeoclimate and ice-sheet modeling integrated with the geological record.”

<http://www.ace.scar.org/>



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Antarctic Climate Evolution



To Understand:

- the scale & rapidity of ice sheet & sea ice response to climate forcing
- sea level changes
- changes in heat sinks/insulators



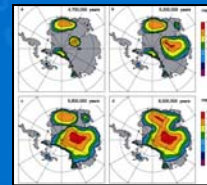
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ANTARCTIC CLIMATE EVOLUTION

Modeling ice-sheet behavior in response to changes in:

- climate
 - ice cores
 - sedimentary facies
 - seismic data
- paleo oceanographic conditions
 - paleo-ecology
 - climate proxies in ocean sediments
- paleo geography
 - recorded in landscape evolution



Building hypotheses and testing through modeling of likely response to future global change



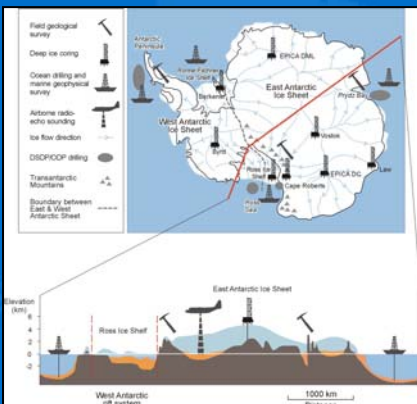
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Antarctic Climate Evolution



Datasets contributing to ACE:
ANDRILL
SHALDRIL

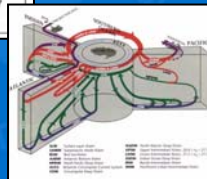
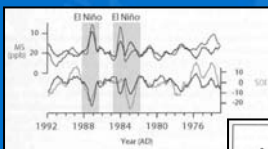


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Antarctica and the Global Climate System (AGCS)

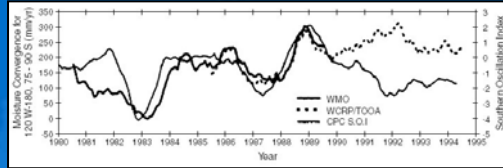
http://www.antarctica.ac.uk/met/SCAR_ssg_ps/AGCS.htm



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Theme 1 - Decadal Time Scale Variability

ENSO links with
West Antarctic mass
balance



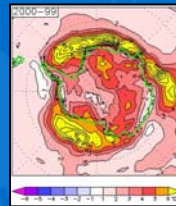
Theme 2 - Global & Regional Signals in Ice Cores



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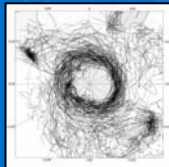
Theme 3 - Natural & Anthropogenic Forcings on the Antarctic Climate System

Prediction of Antarctica
temperature changes by 2100



Theme 4 - The Export of Antarctic Climate Signals

Five years of
Summer Storm
Tracks



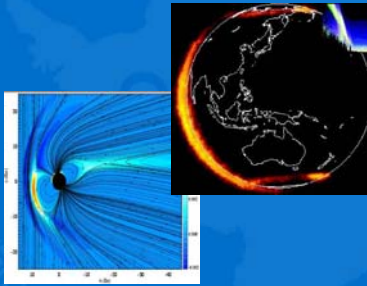
The Deep Ocean
Conveyor Belt



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ICESTAR: Interhemispheric Conjugacy Effects in Solar-Terrestrial and Aeronomy Research

Linking Near-Earth Space to Polar Regions



<http://www.siena.edu/physics/ICESTAR/>

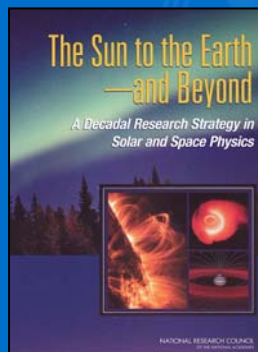


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Challenge

Understand the geospace environment in the polar regions and its dynamical response to external forcing from solar activity



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ICESTAR Goals

- To identify and quantify mechanisms that control interhemispheric regional differences and/or commonalities in the electrodynamics of the Earth's magnetosphere ionosphere system and aeronomy of the upper atmosphere over the Arctic and Antarctic

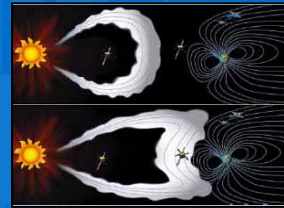
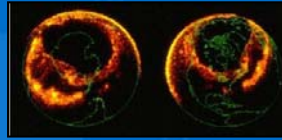
and

- To develop a “virtual data portal” linking together a large number of globally distributed geophysical databases, including both data serving applications and visualization tools; this will enable a systems view of the polar upper atmosphere and geospace



ICESTAR - Four Thematic Action Groups

- Similarities and differences between the Northern and Southern polar upper atmospheres
- Atmospheric consequences of the global electric circuit
- Dynamics of the inner magnetospheric particles, fields and the polar atmosphere
- Creating a data portal for all polar data sets and modeling results

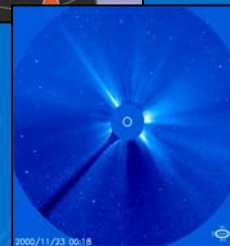
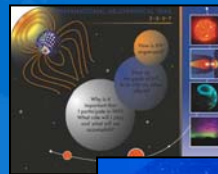


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ICESTAR

- Understanding the interactions between and collective behavior of the Earth system
- Providing a material link between the Sun and Earth through the polar regions



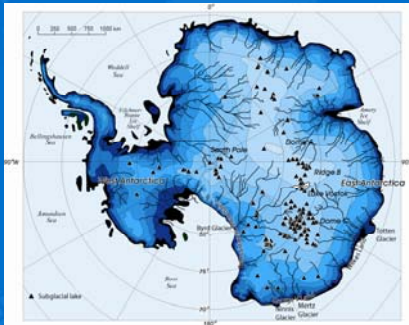
“To use the unique vantage point of the polar regions to develop and enhance observatories studying the Earth’s inner core, the Earth’s magnetic field, geospace, the Sun and beyond.”



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Subglacial Antarctic Lake Exploration (SALE)



<http://salepo.tamu.edu/>



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SALE- Scientific Themes

GLOBAL CLIMATE CONNECTIONS

PALEOCLIMATE RECORDS

LIMNOLOGY AND BIOGEOCHEMISTRY

GEODYNAMICS OF LAKE EVOLUTION

SUBGLACIAL HYDROLOGY

ICE SHEET DYNAMICS

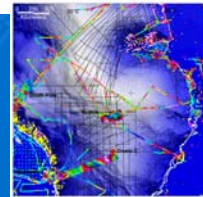
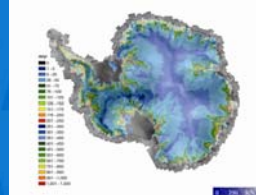
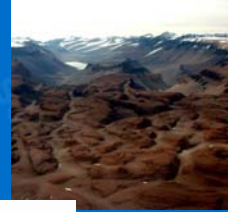
MICROBIOLOGICAL LIFE, EVOLUTION, AND ADAPTATION



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SALE Research

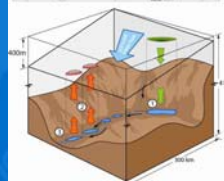
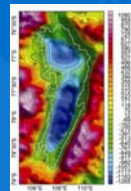
- Advance our understanding of the geological evolution of our planet's 5th largest continent.
- Encourage the development of the next generation of ice sheet models that will incorporate the subglacial environment as an important element of the system.




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SALE Research

- Define the role of large volume discharges of subglacial water on
- Establish the phylogenetic and metabolic diversity of subglacial organisms and their evolutionary position in the Tree of Life.
- Lend clues to the seed organisms for these environments and to special adaptations generated by the interplay of tectonics, geology and climate.




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Evolution and Biodiversity in the Antarctic (EBA): The response of life to change

<http://www.nioo.knaw.nl/projects/scarlsssg/eba/>






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Evolution and Biodiversity in the Antarctic (EBA)

- Examine evolutionary history and adaptations
- Establish gene flow and population dynamics.
- Document organismal, ecosystems and diversity patterns
- Study environmental change, biodiversity and ecosystem function.

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Evolution and Biodiversity in the Antarctic (EBA)

- Circum-Antarctic Census of Marine Life
- Marine Biodiversity Information Network (MARBIN)



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SCAR Scientific Subsidiary Groups

- LIFE SCIENCES
 - **Expert Groups** -Birds, Seals, and Human Biology and Medicine
 - **Action Groups** - Best Practices in Conservation, Biological Monitoring, Census of Marine Life, Acoustics in the Marine Environment
- GEOSCIENCES
 - **Expert Groups** Geographical Information, Permafrost and Periglacial Environments, Geodetic Infrastructure of Antarctica, Antarctic Neotectonics, Antarctic Digital Magnetic Anomaly Project, International Bathymetric Chart of the Southern Oceans
 - **Action Group** -Acoustics in the Marine Environment, Sub-ice Geological Exploration



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