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**ANTARCTIC SUB-GLACIAL LAKES AND WATERS  
THE CHALLENGE TO PROTECT A HIDDEN RESOURCE**

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# The Antarctic Treaty

- Signed in Washington on December 1, 1959, to ensure that Antarctica shall continue for ever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord."
- In force since 1961

# Environment Protocol 1991

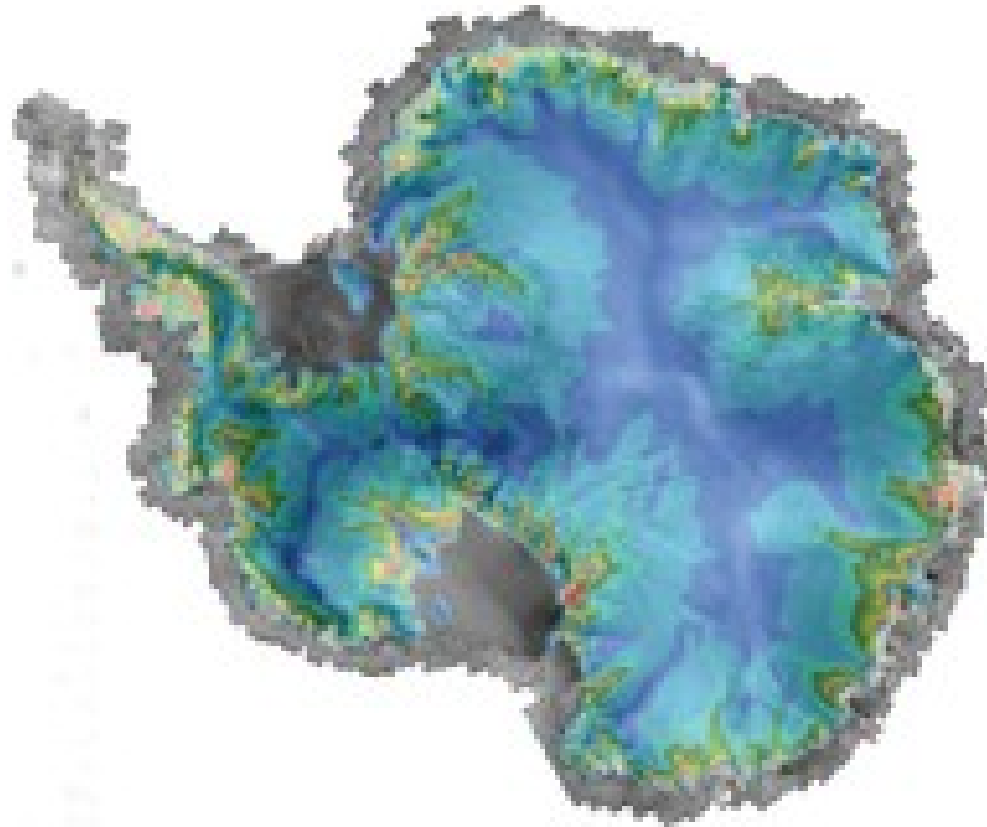
The Protocol was signed in Madrid on October 4, 1991.  
Entered into force on January, 1998.

It designates Antarctica as a “natural reserve, devoted to peace and science”.

The Protocol sets forth basic principles and detailed, mandatory rules applicable to human activities in Antarctica, including obligations to accord priority to scientific research.

Article 7 of the Protocol prohibits all activities relating to Antarctic mineral resources, except for scientific research. Up to 2048, the Protocol can only be modified by unanimous agreement of all Consultative Parties to the Antarctic Treaty. Also, the prohibition on mineral resource activities cannot be removed unless a binding legal regime on Antarctic mineral resource activities is in force (Art. 25.5).

# THE ANTARCTIC CONTINENT



# Committee for Environmental Protection

The Committee for Environmental Protection (CEP) was established in Article 11 of the Environment Protocol. Its functions are defined in Article 12: *The functions of the Committee shall be to provide advice and formulate recommendations to the Parties in connection with the implementation of this Protocol, including the operation of its Annexes, for consideration at Antarctic Treaty Consultative Meetings, and to perform such other functions as may be referred to it by the Antarctic Treaty Consultative Meetings.*

# Scientific Committee on Antarctic Research (SCAR)

SCAR is an inter-disciplinary committee of the International Council for Science (ICSU)

SCAR is charged with the initiating, developing and coordinating high quality international scientific research in the Antarctic region, and on the role of the Antarctic region in the Earth system.

The scientific business of SCAR is conducted by its Standing Scientific Groups which represent the scientific disciplines active in Antarctic research and report to SCAR.

# Joint Committee on Antarctic Data Management (JCADM)

A joint committee of SCAR and the Council of Managers of National Antarctic Programmes (COMNAP).

JCADM is responsible for the Antarctic Data Directory System, centred on:

The Antarctic Master Directory (AMD) and

The National Antarctic Data Centres (NADCs)

## SUBGLACIAL WATER AND LAKES

- MORE THAN 145 LAKES HAVE BEEN IDENTIFIED UNDERLYING THE ANTARCTIC ICE SHEET
- THEY ARE CONNECTED BY STREAMS AS PART OF LARGE WATERSHEDS
- ANTARCTIC TREATY PARTIES ARE THE STATES WITH SPECIAL COMPETENCE ENTAILING A SPECIAL RESPONSIBILITY

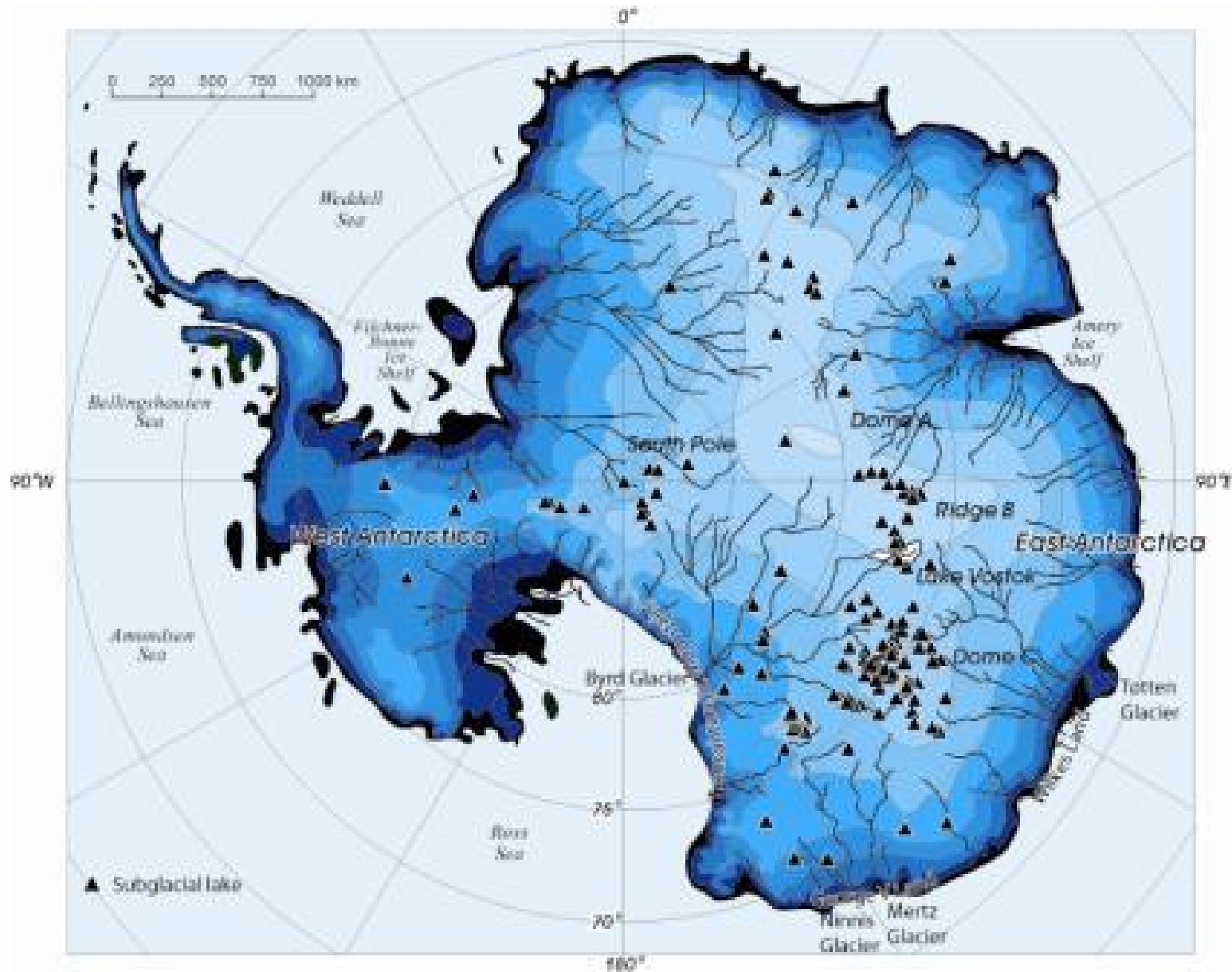


# SUBGLACIAL HYDROLOGY

Subglacial hydrology will be studied by:

- (i) continental-scale surveys using remote sensing (ice-sheet surface elevation changes) and field-based (GPS, radar, seismic) instrumentation;
- (ii) mapping and modeling of subglacial hydro-potentials;
- (iii) evaluation of channel networks as evidence of former drainage events;
- (iv) mapping the spatial and temporal distribution and flux of subglacial water;
- (v) quantification of subglacial discharges from ice sheets to the ocean using geochemical tracers and proglacial monitoring;
- (vi) recovery of the geologic record of hydrologic events; and
- (vii) assessment of the impact of hydrological events on sediment distribution and landscape evolution.

# ANTARCTIC SUBGLACIAL HYDROLOGY



# SCAR PROGRAMME

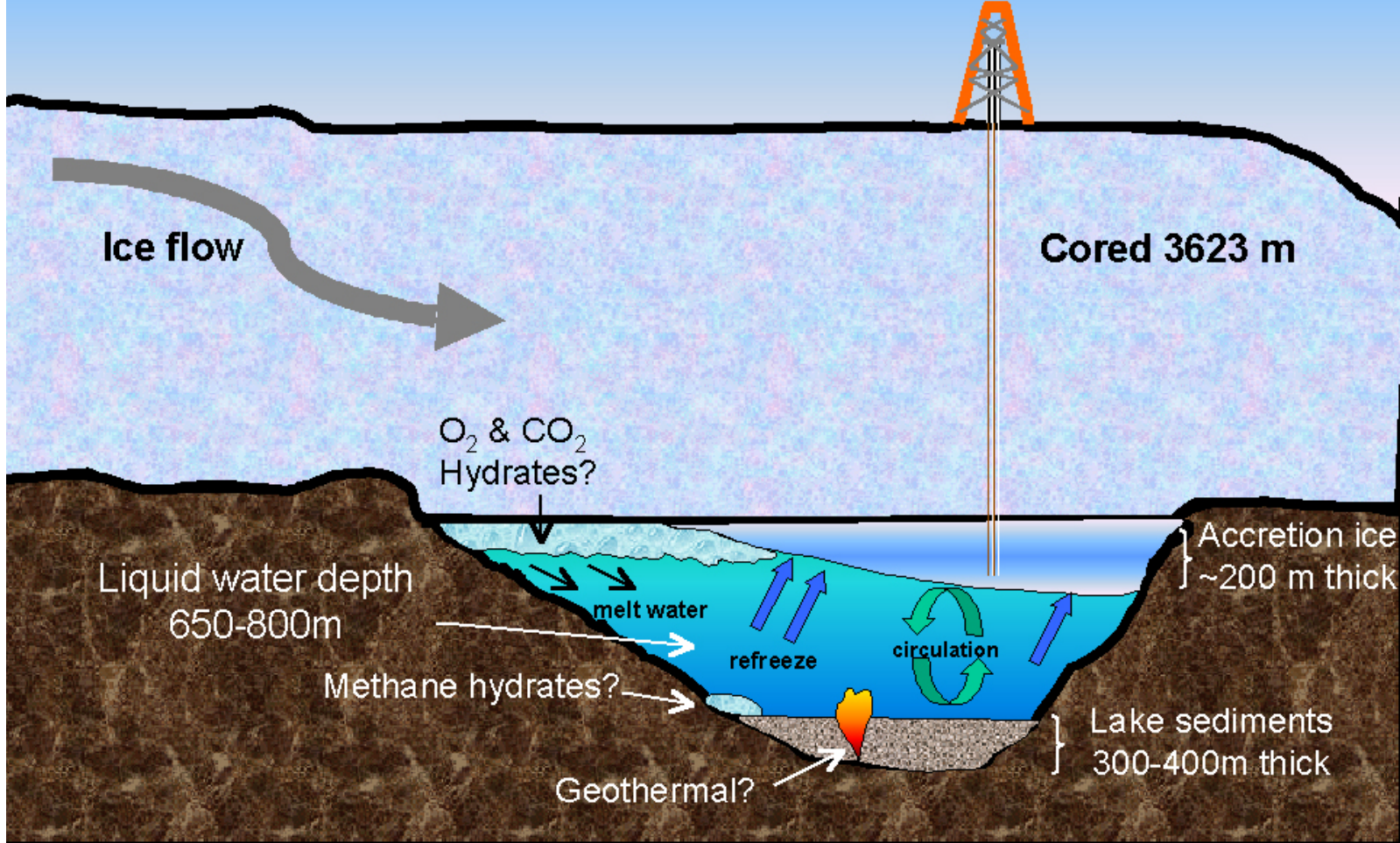
- WITHIN THE TREATY SYSTEM MEMBER STATES ARE ENTITLED TO CARRY OUT RESEARCH AND SCIENTIFIC ACTIVITIES IN THE ANTARCTIC CONTINENT AND IN THE SURROUNDING SOUTHERN OCEAN
- IN 2004 THE SCAR LAUNCHED A PROGRAM FOR SUBGLACIAL LAKES RESEARCH: SALE\_UNITED ( //SCARSALE.TAMU.EDU)
- THESE ACTIVITIES SHOULD BE DEVELOPED ACCORDING TO THE ENVIRONMENTAL IMPACT ASSESMENT (EIA) - ANNEX I OF THE PROTOCOL ON ENVIRONMENTAL PROTECTION

# THE LAKE VOSTOK

- LAKE VOSTOK SURFACE IS SIMILAR TO LAKE ONTARIO
- THE ICE COVERING THE LAKE IS BETWEEN 3,700 AND 4,300 METERS [12,000 and 14,000 FEET] THICK
- RUSSIA HAS LONG MAINTAINED A RESEARCH STATION AT LAKE VOSTOK, AND RUSSIAN SCIENTISTS HAVE PREVIOUSLY PROBED THE LAKE WITH SEISMIC WAVES
- A SCIENTIFIC CONSENSUS WOULD BE NEEDED TO EXPLORE THE LAKE

# LAKE VOSTOK

Vostok Station





# SCAR RECOMMENDATION

- IN 2002 THE SCAR STATED THAT 'THERE IS AS YET NO INTERNATIONAL CONSENSUS AMONG THE SCIENTIFIC COMMUNITY ON APPROPRIATE LAKE SAMPLING OR ON DRILLING METHODS TO PENETRATE INTO THE LAKE (XXV ATCM/IP55)
- IN 2003 RUSSIA CIRCULATED ITS REVISED DRAFT COMPREHENSIVE ENVIRONMENTAL EVALUATION (CEE) FOR WATER SAMPLING BUT IT WAS CONSIDERED NOT COMPLETE
- THE POSSIBILITY OF SPILLING OF DRILLING FLUID (60M3 OF KEROSENE) WAS NOT ENVISAGED

# DRILLING METHODS

- A GREAT DEAL OF TECHNOLOGICAL DEVELOPMENT WILL BE REQUIRED FOR CONTAMINATION FREE SAMPLING
- THERE IS THE POSSIBILITY OF INTERCONNECTION OF ANTARCTIC LAKES AND WATERS
- THE GOAL WOULD BE TO OBTAIN WATER AND SEDIMENT SAMPLES FROM THE LAKE BOTTOM



# POSSIBLE INTERCONNECTION

- IN 2006 THE COMMITTEE ON ENVIRONMENTAL PROTECTION (CEE) OF THE SCAR 'NOTED THAT IT WAS AWARE OF RECENT SCIENTIFIC LITERATURE SUGGESTING THAT IF ONE SUBGLACIAL LAKE WAS CONTAMINATED, CONTAMINATION MAY SPREAD DOWNSTREAM TO CONNECTED LAKES
- IN 2007 SCAR REPORT EXPLAINED THAT SUBGLACIAL ENVIRONMENTS PROVIDES AN OPPORTUNITY TO UNDERSTAND PLANETARY HISTORY
- IN JUNE 2008, IN THE KYIV MEETING OF THE ANTARCTIC TREATY PARTIES, RUSSIA RECALLED A NUMBER OF INCIDENTS THAT OCCURRED IN THE DRILLING 5G-I IN 2007 THAT DELAYED PROGRESS WITH FURTHER DRILLING AND PENETRATION OF THE SUBGLACIAL LAKE VOSTOK

# CURRENT SITUATION

NEITHER THE ANTARCTIC SCIENTIFIC BODIES

WITH ADVISORY CHARACTER

NOR THE CONSULTATIVE MEMBERS OF THE TREATY

CAN PREVENT THE CONTINUATION OF THE DRILLING

OF SUBGLACIAL LAKE VOSTOK

EVEN IF THE PROPOSED CONDITIONS ARE NOT MET

# SUBGLACIAL RESOURCES

IN CASE BENEFITS COULD BE DERIVED FROM THESE SUBGLACIAL RESOURCES, THEIR EQUITABLE APPORTIONMENT SHOULD BE AGREED UPON BY MEANS OF SPECIAL AGREEMENTS ACCORDING TO THE OVERALL RULES OF THE ANTARCTIC TREATY, THE ATCM RECOMMENDATIONS AND THE PROTOCOL ON ENVIRONMENTAL PROTECTION AND ANNEXES