



INGV ACTIVITIES: STATE OF THE ART

Giorgiana De Franceschi

*INGV - Environment Dept.
Annual Conference, 8-9 March 2016, INGV-Rome*

ARCA TEAM@INGV

ROMA2-ROMA1-BOLOGNA-PISA

Giovanni Muscari, Gabriele Mevi, Stefano Urbini, Achille Zirizotti,
Patrizia Macrì, Chiara Caricchi, Leonardo Sagnotti, Stefania
Danesi, Lucia Margheriti, Silvia Pondrelli, Aladino Govoni,
Simone Salimbeni, Paola Del Carlo, Alessio Di Roberto, Ilaria
Isola, Fabio Florindo, Luca Spogli, Lucilla Alfonsi, SET-Umberto
Apponi

Coordinator: Giorgiana De Franceschi
Lab. Grafica e Immagine- Angela Chesi
Administration- Loredana Proto

Support and contribution by

- ENEA- Alcide Giorgio di Sarra, Daniela Meloni
- University of Melbourne



OBJECTIVE: ARCA aims to develop a conceptual model on the mechanism(s) behind the release of large volumes of cold and fresh water from melting of ice caps, investigating this complex system from both paleoclimatic/paleomagnetic and air-sea-ice interaction process points of view.

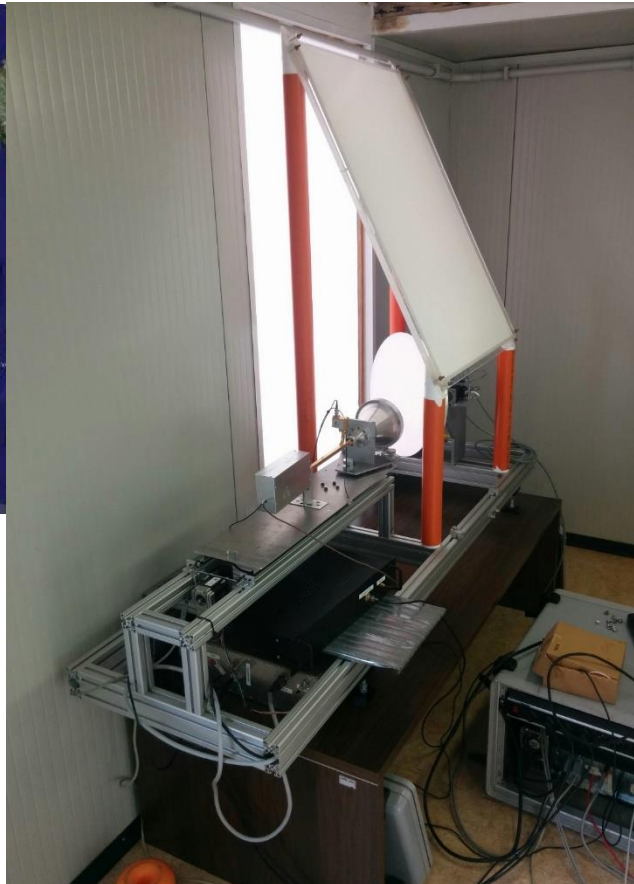
- ✓ **WP1-Investigate the importance of atmospheric parameters on both the energy balance (in particular IR radiation) and the temperature at ground (RM2- Giovanni Muscari).**
- ✓ **WP2-Analysis of the broadband seismic signal recorded by some stations of the GLISN network placed near the fjords at major outlet glaciers (BO-Stefania Danesi).**
- ✓ **Analyze RES datasets for producing thematic maps of outlet glaciers and evaluate the presence of melting water at the ice/bedrock interface (RM2-Stefano Urbini).**
- ✓ **WP3-Study paleomagnetic and magnetic properties of sediment cores from the bottom of the Barents Sea (RM2-Patrizia Macri)**
- ✓ **Analysis of TEPHRA (components, petrology and geochemistry) (PI-Paola Del Carlo).**
- ✓ **Paleoclimate signals recorded in some speleothems from the Antro del Corchia Cave (PI-Ilaria Isola)**
- ✓ **WP4- contribute to the design and implementation of a platform ICT at CNR for ARCA metadata management. Dissemination activities (RM2-SET, Luca Spogli)**



WP1-ATM: Atmospheric Radiation Budget

Impact of atmospheric parameters such as **water vapor**, aerosol and ozone concentrations on the **IR radiation budget** and **temperature** at the ground by:

- 1) making use of existing datasets obtained at Thule Air Base (Greenland) during previous campaigns (2009-2015);
- 2) strengthening the observing capabilities in the Arctic;
- 3) carrying out an additional winter field campaign of atmospheric constituents at Thule.



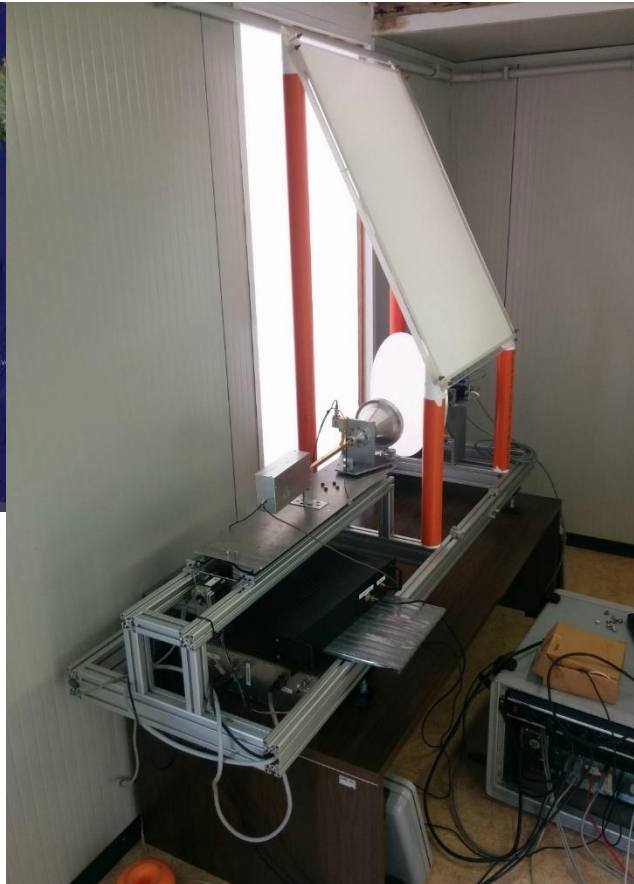
WP1-ATM: Atmospheric Radiation Budget

Impact of atmospheric parameters such as **water vapor**, aerosol and ozone concentrations on the **ground radiation budget** (at IR wavelengths in particular) and **temperature** by:

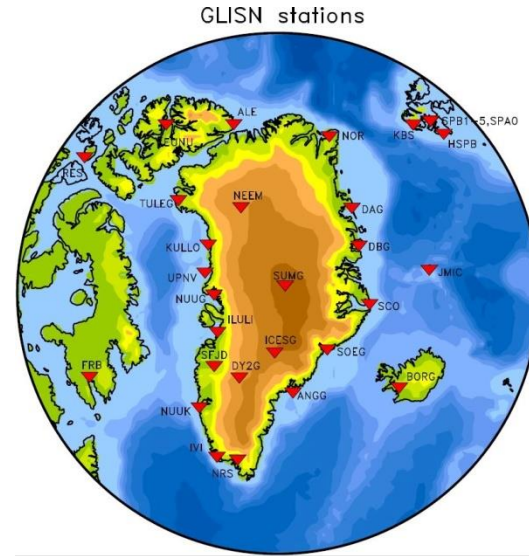
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Water Vapor
Spectrometer **VESPA-22**

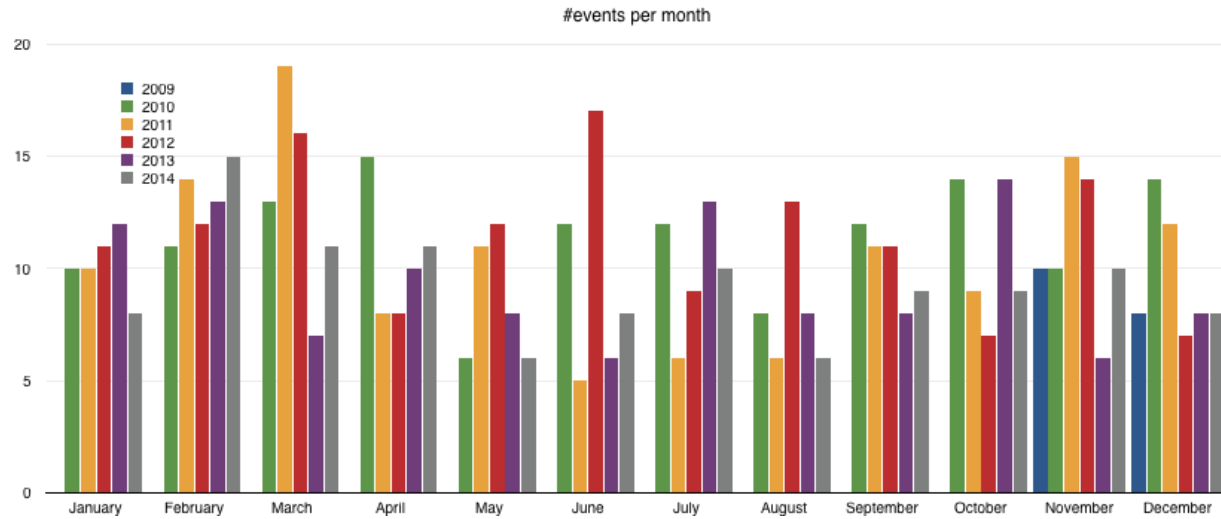
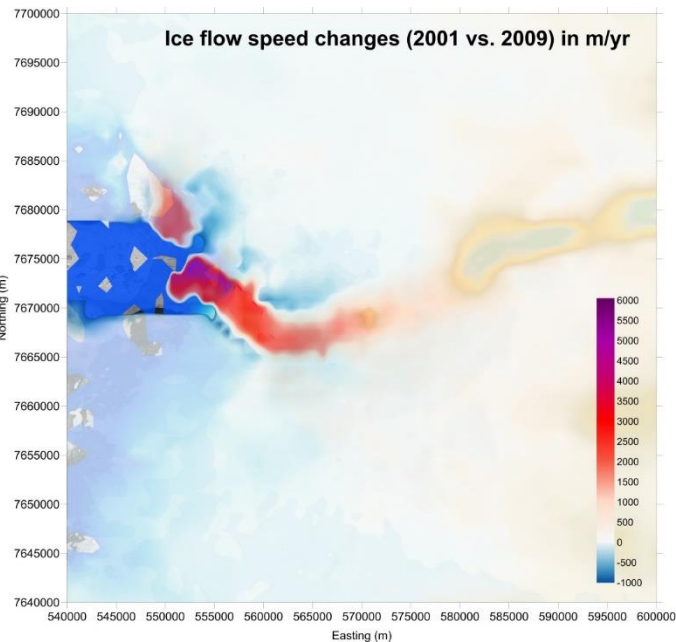


WP2: Study of the seismic signal for the detection of seiche waves originated by iceberg calving at outlet glaciers (Radio Echo Sounding & GLISN).

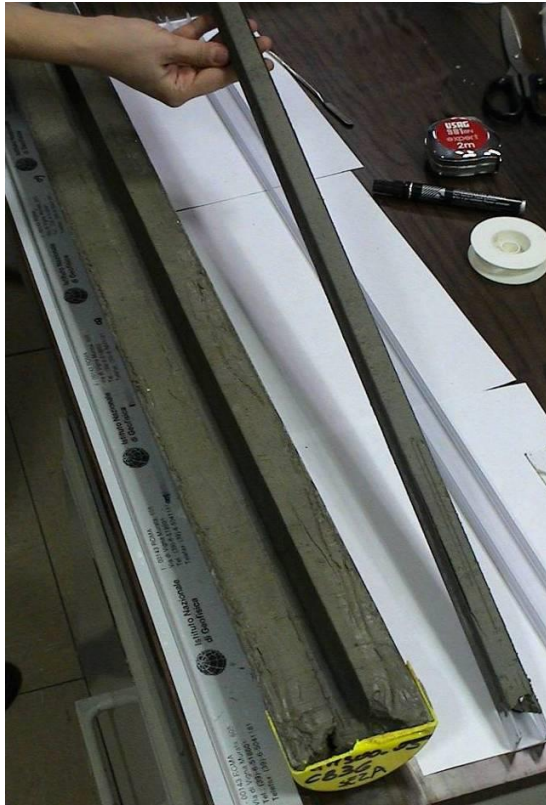


Greenland Ice Sheet Monitoring Network
www.glisn.info

Number of calving events detected at station ILULI – monthly variation from 2009 to 2014.



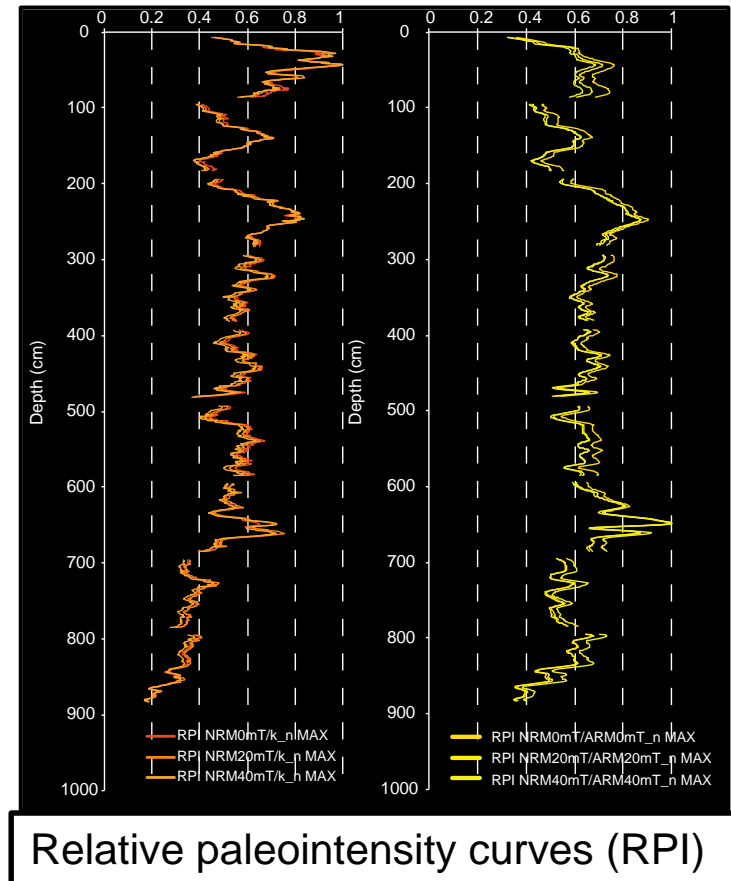
WP3: Paleomagnetism and rock magnetism of sediment cores. Tephrocronology



Paleomagnetic and rock magnetic analyses have been carried out on 4 cores recovered from S-W Svalbard.

**CORIBAR
Project**

ChRM directions and rock magnetic parameters have been measured (1-cm spacing) and RPI records were obtained.

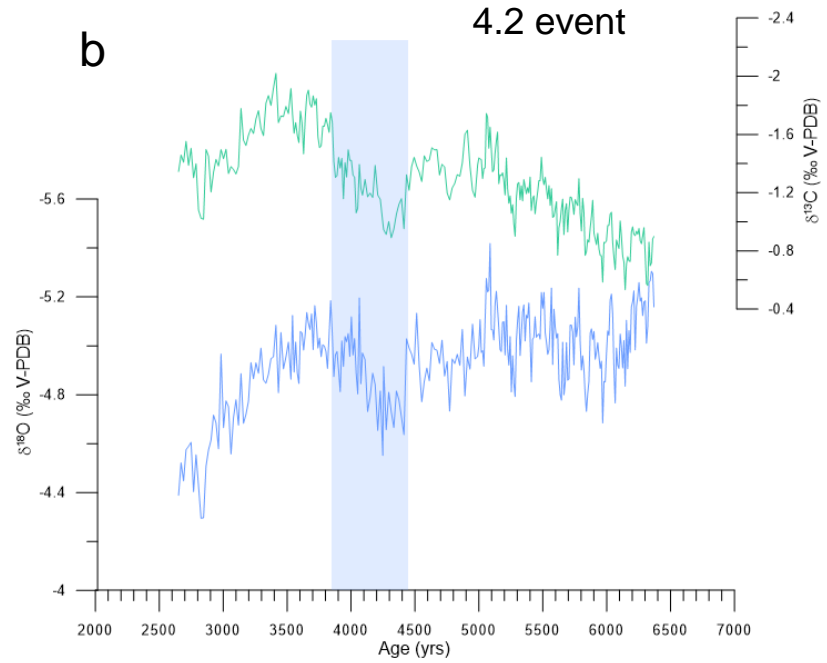
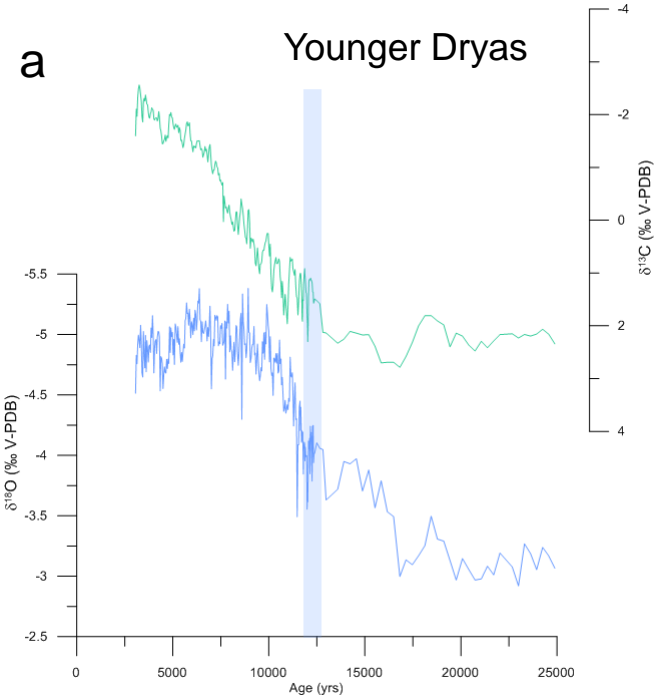


In the GS191-01 PC CORIBAR core (PREPARED CRUISE 2014), ca. 70 samples have been analysed in order to search for Criptotephra useful for dating sediments.

WP3 – High resolution paleoclimate record based on speleothems.

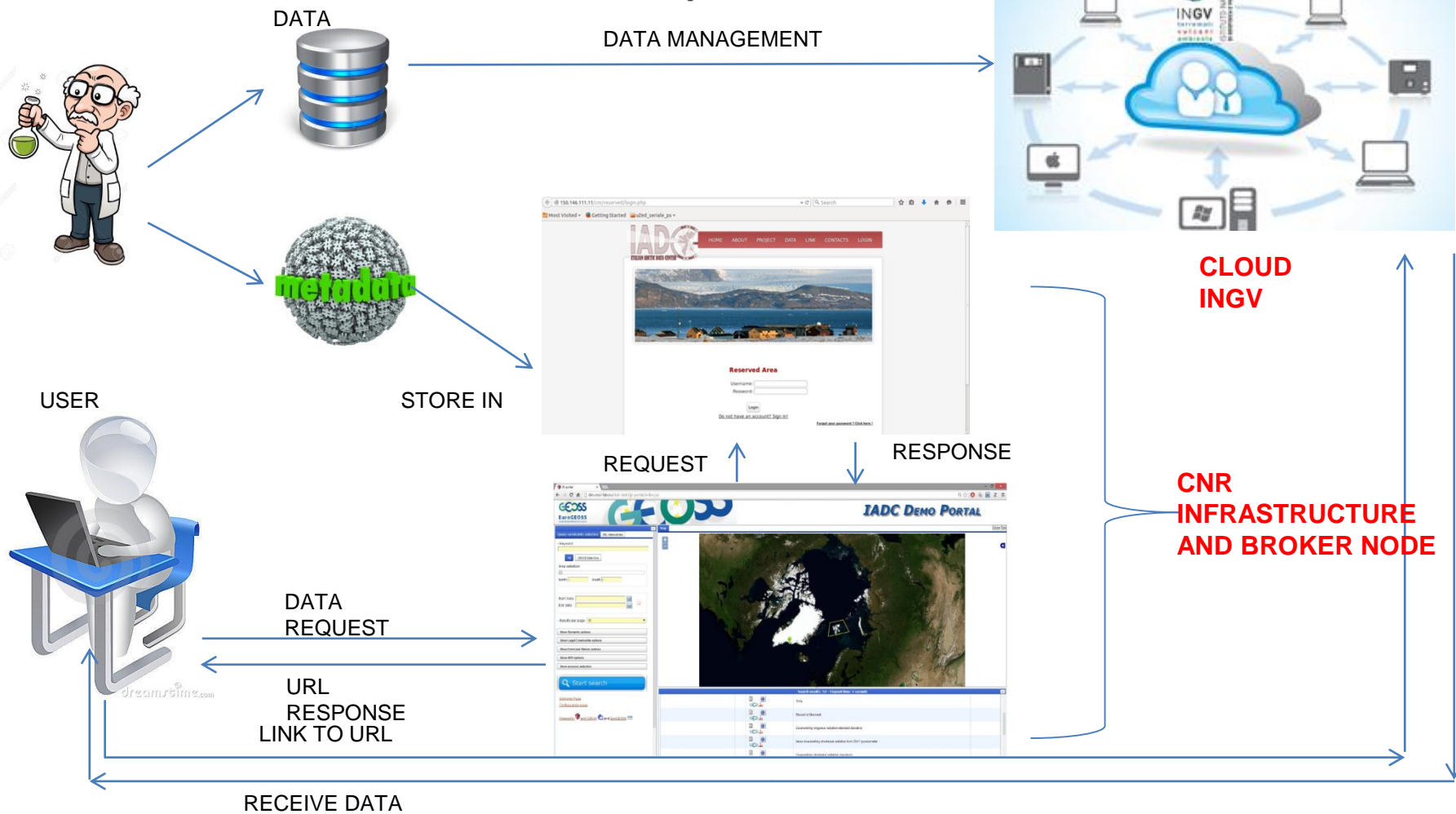
Three speleothems were analyzed at high resolution, for $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$. For two of them trace elements analysis were performed. They record some of the Holocene Rapid Climatic Changes.

Sampling site: Galleria delle Stalattiti, Antro del Corchia Cave (Alpi Apuane)





Conceptual Model



WP4- Dissemination - INGV



- The graphic design, including logo and corporate, was designed and built by GRAPH. LAB. - INGV.
- The release of the website is forthcoming after the review of contents by ARCA Editorial Board (L. Alfonsi in charged for INGV). The portal is hosted at CNR www.arcaproject.it
- The ARCA Final Conference will be organized in October 2016 at CNR. A meeting on that is scheduled in March 2016.
- A paper on ARCA project and activities has been submitted to the next SCAR OSC (Kuala Lumpur, August 2016)
- Several papers on different ARCA topics have been presented. Papers are in preparation and will be submitted for publication.