

Polar Space Task Group (PSTG-1)

First meeting

Status of relevant missions and/or activities related to polar observations, research and services - BRAZIL

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Brazil has a small community using remote sensing data for studying the polar regions. Most of the interest is related to Antarctica and the Southern Ocean. Studies vary from small scale mapping for geographical purposes to large scale, multi temporal analysis of oceanographic parameters. Satellite telemetry (mostly ARGOS) is also very important as a number of projects depend upon this technique to download data from Platform Transmit Terminals (PTTs) installed in Antarctica to Brazil.

When the Brazilian Antarctic Program (PROANTAR) was established in mid 1980's, nearly all activities related space technology and applications were made at the National Institute for Space Research (INPE). Since the beginning of the program to these days, INPE was present in many activities in a range of subjects varying from Space Science, Meteorology, Oceanography, Ozone Layer Dynamics and others. The

longest series of environmental data collected by Brazil in Antarctica, especially at the location of the Brazilian Antarctic Station “Comandante Ferraz” (EACF) is maintained by INPE using funds from PROANTAR. Meteorological data collected at EACF, for instance, are downlinked in a regular basis using ARGOS system since the beginning of the PROANTAR. Scientists and technicians from the Weather Prediction and Climate Studies Center (CPTEC) of INPE are directly involved in this activity which is considered the most operational activity of Brazil in Antarctica. Telemetry link is also used in a regular basis for oceanographic studies with drifting buoys and marine mammals.

At the present PROANTAR is considered to be in a mature stage. Logistics are provided by the Brazilian Navy who maintains the EACF and two polar ships dedicated to the program. The funding agency of PROANTAR is the CNPq (Brazilian National Council for Scientific and Technological Development). In the last 3 years the council have funded 19 individual projects for Antarctic research as well as established two very big projects under a program to establish the so-called “National Institutes of Science, Technology and Innovation”(INCTs). Most of the funds were directed to universities spread all over the country. The INCT of the Cryosphere (INCT Cryo) was established aiming mostly the study of the Antarctica’s ice, the Southern Ocean dynamics and the teleconnections between Antarctica and South America via meteorological and oceanographic climate links. The INCT for Environmental Antarctic Research (INCT APA) aims to study the environmental changes in the Antarctic environment (including the UV radiation dynamics) and link them to the physical, chemical and biological forcing. The biological response to environmental stress in Antarctica, especially in the vicinity of the EACF is also object of study.

As one of the objectives of the INCT Cryo, the monitoring of the ice mass around the Antarctic Peninsula and at the Weddell Sea has become a major task for Brazil. Remote sensing data from many satellites and sensors are used. Optical sensors such as the Terra ASTER, Landsat TM/ETM+, as well as radar such as the Envisat ASAR, Cosmo-SkyMed, TerraSAR-X e SSMI are mostly used. Inovative work comparing *in situ* with satellite data for studying the oceanographic conditions of the Bransfield Strait and Weddell Sea are also performed by a group supported by the INCT Cryo.

Most of the work is made using images of sea color sensors such as the SeaWiFS and Aqua MODIS. NOAA AVHRR, Aqua AMSR, QuikSCAT SeaWinds and altimetry data are also used in many works in the INCT Cryo. In the last cases, satellite and *in situ* measurements over the South Atlantic are used to investigate connections between Antarctica and South America, especially focusing in the modulation of the atmospheric boundary layer by the sea surface temperature gradients along the path of air masses from higher to lower latitudes over South America and the South Atlantic Ocean.