The oceanic region off Brazil, from the Amazon mouth to the Uruguayan border, is part of the western limits of the South and Tropical Atlantic and, consequently, impacted by the global ocean circulation. Changes in the large scale ocean circulation resulting from changes in Earth’s climate will certainly have significant impacts on the oceanic region adjacent to the Brazilian shores, affecting the temperature, salinity and heat content in the upper-layer of the ocean. Changes in these physical properties will result in alterations of the local climate, with impacts on the hydrological cycle and on the fluvial discharge regimes along the coastal regions. The regional climate alterations, associated with changes in the Brazil Current dynamics and in the wave and wind regimes, will alter the coastal hydrodynamics and the upwelling systems, with profound impacts on the biological pump and the biogeochemical cycles on the continental shelf. To understand these impacts and to provide valuable information for different stakeholders and decision-makers, multi-institutional and multi-disciplinary research programs are being conducted in Brazil.

An important component of the Brazilian observational program is the PIRATA Project, which has been monitoring the Tropical Atlantic for more than a decade, in cooperation with France and the United States. Two other relevant efforts in the western Subtropical South Atlantic have just started, with the leadership of the Oceanographic Institute of the University of Sao Paulo (IOUSP). One of IOUSP’s observational efforts, the Atlas-B Project, is based on the maintenance of current meter arrays across the Brazil Current, in the Southeastern Brazilian Bight (22S to 28S), and the development of an Atlas-like buoy (similar to the ones used in the TAO and PIRATA arrays). The first of these buoys, the Guariroba, will be deployed near 28°S, 42°W, a region where in 2004 was formed the first ever documented hurricane in the South Atlantic: the Catarina. Repeat oceanographic cruises will allow the assessment of seasonal and longer term variability, thus contributing to the understanding of how possible climate changes are affecting physical, chemical and biological processes in the region. Another important project is a contribution to the International SAMOC (South Atlantic Meridional Overturning Circulation) Program, for monitoring mass, heat and fresh water fluxes across a line from South America to Africa along 34S: the SAmoc Basin Wide Array (SAMBA). In cooperation with Argentina and the U.S. (NOAA/AOML), IOUSP will conduct repeat hydrographic cruises and maintain an array of C-Pies, ADCPs and other sensors in the western end of the SAMBA line.

Parallel to the in situ observational program, a hierarchy of models is being used, covering scales from global to coastal and estuarine. This work is conducted at the IOUSP’s Ocean Numerical Modeling Laboratory (LABMON) and at the Super Computer system at the Brazilian National Space Research Institute (INPE).