Session: C24 Poster: T201A

ESA's future contributions to climate system observations and for a better understanding of Earth system processes

Paul Ingmann[†]; Mark Drinkwater
[†] European Space Agency, ESA, Netherlands
Leading author: paul.ingmann@esa.int

The European Space Agency (ESA) has made dedicated spaceborne observations of the Earth since the 1977 launch of its first meteorological mission Meteosat. Subsequently the series of Meteosat satellites, ERS-1, ERS-2, Envisat, and Metop have each successively added to the wealth of data characterising the Earth's climate and changing environment. As a follow-up, ESA's Living Planet Programme (http://www.esa.int/livingplanet) was created, comprising of two main components: a science and research element focused on a better understanding of Earth-system processes in the form of the Earth Explorer missions, and the Earth Watch element designed to facilitate the delivery of Earth Observation data for eventual use by operational monitoring based services. The Earth Explorer missions are designed to address critical and specific issues that have been raised by the science community, and at the same time to demonstrate breakthrough technology in observing techniques. By contrast, the GMES Sentinel series of missions have been designed to respond to a series of operational service needs established within the Earth Watch element. According to the new approach, the scientific questions to be addressed should be the starting point for the definition of the satellite missions and should be the driver for all requirements to be fulfilled by the missions. This has been the philosophy behind ESA's Living Planet Programme, and in particular with the Earth-science driven Earth Explorer missions. The selection of new Earth-science missions according to the new strategy resulted in the selection of the GOCE and ADM-Aeolus missions in 1999. Since then, successive Calls for Proposals were issued resulting in the selection of CryoSat, SMOS, Swarm and EarthCARE. Five further candidate missions are currently undergoing feasibility study, namely BIOMASS, CoReH2O, PREMIER, CarbonSat and FLEX. Three Earth Explorer missions have recently been launched, namely GOCE, CryoSat-2, and SMOS, while three missions are currently in development, namely ADM-Aeolus, Swarm, and EarthCARE. The missions in operation have been delivering fundamentally new observations and data products to address aspects of the climate system but also providing new insights into Earth-system processes. Highlights and recent results will be presented from the currently operating Explorer missions. The Earth Explorer (research oriented programme) is complemented by operational missions for (a) meteorology in cooperation with EUMETSAT and (b) the GMES Sentinel missions in cooperation with the European Commission. The latter missions are the European contribution to GEOSS for which ESA takes the responsibility of developing the space component. The observational capabilities of the six Sentinel missions will be outlined together with the status of their development.