

## **ESA Earth Observation Satellite data for climate purposes**

CGMS is informed about the potential use of ESA EO satellite data for climate purposes.

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## 1. Introduction

The ESA Earth Observation (EO) satellites are designed and operated in order to fulfill the R&D objectives assigned to each of their missions.

## 2. Past satellites

The first EO satellite ever launched by ESA, in 1977, was Meteosat, a geostationary weather satellite. It was followed by six of the same series, now being fully operated by Eumetsat. The ESA Meteosat archives were handed over to Eumetsat in due time. The Meteosat database constitutes a very good record of climate data, that Eumetsat is recovering both physically (from the original tapes to a long term archive) and by re-processing. It is contributing since 1978 to the International Cloud Climate Programme (ICCP).

## 3. Actual satellites

### 3.1 ERS

The longest series of ESA EO archived data corresponds to the ERS (ESA Remote Sensing satellites), launched in 1991 and 1995 respectively. The ERS-2 is still providing useful data, although there have been some gaps during the last two years, due to various failures.

The main sensors on board ERS-1 were:

- Synthetic Aperture Radar (SAR), working as well in wave mode
- Scatterometer (global, except when SAR coverage)
- Radar Altimeter & Microwave radiometer MWR
- ATSR Along Track Scan Radiometer

ERS-2 has in addition:

- GOME Global Ozone Monitoring Experiment
- A modified ATSR

It is worth noting that the MetOp series, the first of which is to be launched in 2005, embarks advanced continuations of the ERS-1/2 scatterometer and of the GOME on board ERS-2, assuring thus long term records of e.g. ocean wind fields and Ozone data.

### **3.2 ENVISAT**

Launched in March 2002, this ambitious platform has on board ten instruments, some of them being an advanced continuation of the ones embarked on ERS

- ASAR advanced SAR, again including wave mode
- RA-2 advanced Radar Altimeter and MWR
- AATSR advanced ATSR

While the Chemistry payload will continue and enlarge the atmospheric composition records started by GOME.

- SCHIAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric Cartography)
- GOMOS (Global Ozone Monitoring by Occultation of Stars)
- MIPAS (Michelson Interferometer for Passive Atmospheric Sounding)

A completely new instrument MERIS (Medium Resolution Imaging Spectrometer) will begin the ESA database for ocean colour monitoring.

## **4. Future satellites**

The ESA EO “Living Planet program” represents a new, flexible and user-friendly approach to the whole concept of EO from space. It responds to the present ESA EO strategy.

### **4.1 Earth Explorers**

The ESA Earth Observation Earth Explorers (i.e. focusing on research) already approved will establish new databases on:

- ADM/Aeolus: 3-D wind fields
- SMOS: soil moisture and salinity
- GOCE: gravity field and geoid information
- CRYOSAT: polar ice mass information

### **4.2 Earth Watch**

The ESA Earth Observation Earth Watch program (operational services driven missions) has various lines:

- Operational meteorology and climate monitoring: in co-operation with Eumetsat
- Global Monitoring missions: the medium term plan is considering continuity to the Ocean and Land missions.
- Advanced Imaging missions: InfoTerra/TerraSAR and Fuegosat are being consolidated.
- GMES Service Element: the first phase started in 2002.

## **5. Data maintenance**

All ESA Earth Observation data are stored in ESA's archiving facilities. Supporting media used are in line with available technology. Reprocessing is carried out on ad-hoc basis.

## **6. References**

CGMS-XXXI-ESA-WP-01  
WMO publication 411  
[www.esa.int](http://www.esa.int)