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POLDER IN-FLIGHT RESULTS

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ABSTRACT : This paper presents a global approach of POLDER (Polarization and Directionality of the Earth's Reflectance) program : from instrument design , pre-flight and in-flight calibrations till the first in-flight results . The POLDER sensor has been developed by the Centre National d'Études Spatiales, the French space agency . It is part of the payload of the Advanced Earth Observation Satellite (ADEOS) developed by NASDA and launched in August 1996. POLDER had been acquiring data till the loss of ADEOS in June 1997.

The POLDER sensor is designed to collect global and repetitive observations of the solar radiation reflected by the Earth-Atmosphere system for climate research . This includes the aerosol cycling, the aerosol-cloud-radiation interactions, the Earth radiation budget, the ocean primary production and the continental biosphere dynamics .

The sensor is a wide field-of-view (2400 Km swath), moderate resolution (6x7 Km² at nadir) multi-spectral imaging radiometer / polarimeter . The instrument concept is based on a telecentric optics, a rotating wheel carrying 15 spectral filters and polarizers, and on a bidimensionnal CCD detector array ; owing to this concept, POLDER has the unique ability to measure polarized reflectances, to observe target reflectances from up to 14 directions during a single satellite pass and from more directions by multi-pass combination.

The multi-disciplinary scientific objectives of POLDER lead to severe radiometric and geometrical requirements, as well as a very accurate calibration of the sensor ; these requirements are achieved through a stable instrument design and an original ground processing . The first images presented show the originality of polarized images after processing and also the contribution of multi-directionnal viewing.

A redundancy model of POLDER instrument has been manufactured . It will be flown on the NASDA ADEOS II satellite the launch of which is planned in 2000 .