

MEGHA-TROPIQUES: A LOW-EARTH ORBIT SATELLITE MISSION FOR CLIMATE AND ATMOSPHERIC RESEARCH AND APPLICATIONS

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Abstract

The Megha-Tropiques satellite is an Indo-French satellite for atmospheric applications and climate research in the tropics. “MEGHA” in Sanskrit is cloud and “TROPIQUES” in French is tropics. The Megha-Tropiques Mission encompasses development of a low-earth-orbiting satellite, its launch, operations and utilisation of the science data for studies of the tropical atmosphere for climate and atmospheric research and meteorological applications.

The Megha-Tropiques satellite is configured with four advanced scientific sensors on the Indian Space Research Organisation ISRO’s Indian Remote Sensing (IRS) satellite platform. It orbits at an altitude of 866 km at an inclination of 20 degrees. The inclined orbit facilitates high temporal sampling of up to 6 times per day in the 10° – 15° latitude band. The payloads are: Microwave Analysis and Detection of Rain and Atmospheric Structures (MADRAS) – an imager at 18, 23, 36, 89 and 157 GHz; Sounder for Atmospheric Profiling of Humidity in the Inter-tropical Regions (SAPHIR) - a 6-channel humidity sounder at 183 GHz; Scanner for Radiation Budget (SCARAB) – a 4-channel radiation budget sensor; and Radio Occultation Sounder for Atmosphere (ROSA) – a two-channel GPS radio occultation sounder. MADRAS was jointly developed by ISRO and CNES while SAPHIR and SCARAB were provided by CNES; ROSA was procured by ISRO from TASI.

The satellite was launched from the ISRO’s Satish Dhawan Space Centre on 12 October 2011 by ISRO’s Polar Satellite Launch Vehicle (PSLV). The spacecraft control is done by ISRO’s ISTRAC control centre, Bangalore. Science data reception and processing are done at ISTRAC and ISSDC, Bangalore, respectively. For enhanced near-real-time capability, science data is also received at CNES stations at Kourou and HBK (SA), which receive data from orbits not visible from Bangalore. The data products are being made available to all the registered users including the Indian and French scientists and international agencies and Announcement of Opportunity Principal Investigators (AO-PI’s).

This paper presents an overview of the mission, the satellite, and the payload sensors. It also highlights a few early results indicating on-orbit performance.

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