

## **Oceans and climate: The TropSat Observatory for mesoscale convective system processes in the global maritime tropics**

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TropSat is an earth-observing satellite mission concept with a minimum science goal of detecting and characterizing mesoscale convective system (MCS) as they occur successively for individual systems in all tropical ocean basins. Tropical MCS are fundamental drivers of global weather and climate. Their accurate characterization is the key to understanding and modelling the sub-grid scale processes critical to the evolution of large-scale air-sea dynamics; i.e. including tropical cyclogenesis, monsoons, the Madden-Julian Oscillation, and the El Niño-Southern Oscillation. MCS processes are now, or will soon be, within the resolution limits of the most sophisticated global general circulation models. However, MCS processes across the MCS life-cycle, are poorly represented in these models. TropSat observations will finally offer the observational basis necessary to understand and parameterize MCS initiation and life cycles for each tropical basin, setting the stage for major advances in global modelling. The TropSat instrument concept is a spacecraft integrated active and passive microwave sensor with channels and polarizations carefully selected to optimize simultaneous detection of the MCS environmental signals. TropSat will provide high spatial resolution measurements of surface winds, rain rate, total column moisture, and layer-averaged temperatures (i.e. SST and upper-level atmospheric temperature). Broad swath design and an unique low-inclination orbit focus temporal resolution (approximately two-hourly) on the global maritime tropics. The principal geophysical targets for TropSat are the processes of organization, evolution and senescence that characterize the MCS life-cycle stages.