



## **Microwat : a new Earth Explorer mission proposal to measure the Sea surface Temperature and the Sea Ice Concentration**

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Ocean surface characterization from satellites is required to understand, monitor and predict the general circulation of the ocean and atmosphere. With more than 70% global cloud coverage at any time, visible and infrared satellite observations only provide limited information. The polar regions are particularly vulnerable to the climate changes and are home to complex mesoscale mechanisms that are still poorly understood. They are also under very persistent cloudiness. Passive microwave observations can provide surface information such as Sea Surface Temperature (SST) and Sea Ice Concentration (SIC) regardless of the cloud cover, but up to now they were limited in spatial resolution.

Here, we propose a passive microwave conically scanning imager, MICROWAT, in a polar orbit, for the retrieval of the SST and SIC, with a spatial resolution of 15km. It observes at 6 and 10GHz, with low-noise dual polarization receivers, and a foldable mesh antenna of 5m-diameter. Furthermore, MICROWAT will fly in tandem with MetOp-SG B to benefit from the synergy with scatterometers (SCA) and microwave imagers (MWI).

MICROWAT will provide global SST estimates, twice daily, regardless of cloud cover, with an accuracy of 0.3K and a spatial resolution of 15km. The SIC will be derived with an accuracy of 3%. With its unprecedented "all weather" accurate SST and SIC at 15km, MICROWAT will provide the atmospheric and oceanic forecasting systems with products compatible with their increasing spatial resolution and complexity, with impact for societal applications. It will also answer fundamental science questions related to the ocean, the atmosphere and their interactions.

\* Prigent, Aires, Bernardo, Orhac, Goutoule, Roquet, Donlon, Analysis of the potential and limitations of microwave radiometry for the retrieval of sea surface temperature: Definition