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Oxygenated Compounds in the Tropical Atmosphere (OCTAVE) : estimation of top-down methanol and formic acid fluxes based on IASI data

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Oxygenated Volatile Organic Compounds (OVOCs) have a significant impact on the atmospheric oxidative capacity and climate. However, large discrepancies in OVOC budget estimates still exist, mostly due to incomplete representation of photochemical OVOC production, uncertainties in terrestrial emissions and ocean/atmosphere exchanges of OVOCs and their precursors, and the paucity of OVOC observations in tropical regions. A better understanding of OVOC sources and sinks is required to quantify their impact on atmospheric oxidants, on the lifetime of methane and consequently on climate. OCTAVE aims to an improved assessment of the budget and role of OVOCs in tropical regions, and especially over oceans, relying on an integrated approach combining satellite retrievals, modelling and in situ measurements. To that purpose, an innovative methodology is applied to generate global column distributions of methanol, formic acid and other key VOCs using multi-annual remote sensing data from the IASI sensor aboard the MetOp platform. Based on the spaceborne observations, complemented by a wide collection of aircraft, ship-based and ground-based measurements, an improved model evaluation of the OVOC budget will be performed. The IASI data will be further used to constrain the budgets of methanol and formic acid simulated by the IMAGESv2 global model based on a Bayesian adjoint-based inversion approach, and to determine the impact of OVOCs on the oxidizing capacity of the tropical atmosphere. The satellite OVOC observations will be compared and validated towards remote-sensed FTIR column data and in situ PTR-MS mass spectroscopy data obtained at the tropical site of La Reunion, located in the Indian Ocean.