

EGU2020-20408

<https://doi.org/10.5194/egusphere-egu2020-20408>

EGU General Assembly 2020

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## **Global In-Situ Observations of Essential Climate and Ocean Variables by the Global Drifter Program. Applications and Impacts**

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Accurate estimates and forecasts of physical and biogeochemical processes at the air-sea interface must rely on integrated in-situ and satellite surface observations of essential Ocean/Climate Variables (EOVs /ECVs). Such observations, when sustained over appropriate temporal and spatial scales, are particularly powerful in constraining and improving the skills, impact and value of weather, ocean and climate forecast models. The calibration and validation of satellite ocean products also rely on in-situ observations, thus creating further positive high-impact applications of observing systems designed for global sustained observations of EOv and ECVs.

The Global Drifter Program has operated uninterrupted for several decades and constitutes a particular successful example of a network of multiparametric platforms providing observations of climate, weather and oceanographic relevance (e.g. air-pressure, sea surface temperature, ocean currents). This presentation will review the requirements of sustainability of an observing system such as the GDP (i.e. cost effectiveness, peer-review of the observing methodology and of the technology, free data access and international cooperation), will present some key metrics recently used to quantify the impact of drifter observations, and will discuss two prominent examples of GDP regional observations and the transition to operations of novel platforms, such as wind and directional wave spectra drifters, in sparsely sampled regions of the Arabian Sea and of the North Atlantic Ocean.