# A first catalogue of internal waves in SAR imagery for summer 2018 and their relationship with atmospheric forcing within the framework of project HabWAVE

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HabWAVE – From benthic resting stages to HAB events: understanding the role of physical-biological coupling off NW Portugal – is a project that aims at developing new forecasting capabilities for blooms of a paralytic shellfish poisoning species (*Gymnodinium catenatum*) that is particularly recurrent and economical relevant in the coast of Portugal. It is based on the hypothesis that oceanic internal waves (IW) and bottom currents are physical mechanisms capable of re-suspending dormant cysts of this species from sediments, allowing for planktonic blooms.

The first task within HabWAVE is to study the occurrence and the characteristics of oceanic IW off NW Portugal. Synthetic Aperture Radar (SAR) imagery is a well-established tool for this purpose. Oceanic internal waves originate from the barotropic tide and propagate in packs along the pycnocline. This results in convergence and divergence zones that in turn translate at the surface into regions of increased and decreased roughness, respectively. These patterns are seen as alternating brighter and darker bands on the SAR image. However, a number of factors can affect the characteristics of these signatures, namely the wind forcing.

All SAR images from ESA's Sentinel-1A and 1B for the period from June to October 2018 were obtained from the Alaska Satellite Facility (ASF) Vertex Data Portal, and visually inspected to detect IW signatures. The images were catalogued and grouped into four different types according to their visual characteristics: speckled, strong contrast, multi-signatures, and optimal.ª A preliminary analysis of this catalogue is presented by comparing the observed patterns with wind fields from the European Centre of Medium-range Weather Forecast (ECMWF) Atmospheric Model high resolution 10-day forecast. The purpose is to identify properties in the image more likely to be due to atmospheric forcing than to the properties of the IW themselves. The ultimate goal within HabWAVE is to identify the IW characteristics that are most prone to sediment re-suspension on the shelf, and therefore HAB events of *G. catenatum* in order to aspire to implementing a forecast system.

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