HARMFUL ALGAL BLOOM DETECTION

Application: To detect a possible toxic algal bloom to anticipate its drifts into sensitive areas such as fish and shellfish farms.
Users: Operators and decision makers in the aquaculture sector.
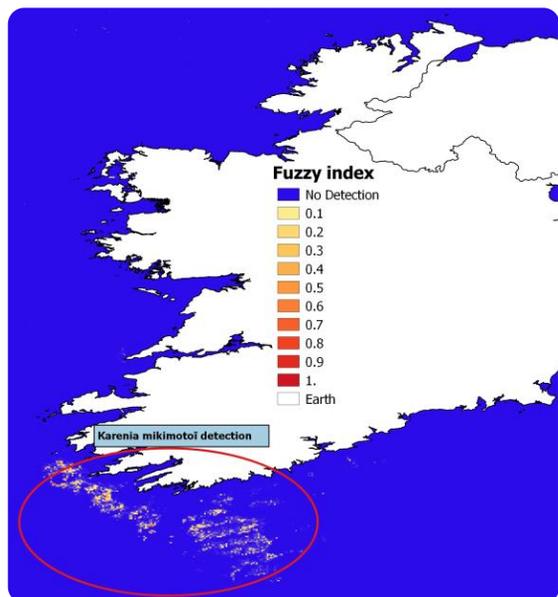**Availability:** Daily at 1km resolution.

FIGURE 1: SAFI K. mikimotoi DETECTION INDEX (FUZZY INDEX), FROM 0 (PROBABILITY NULL) TO 1 (HIGH PROBABILITY)

FIGURE 2: ALGAL BLOOMS POSE SERIOUS PROBLEMS TO AQUACULTURE, FISHERIES AND RECREATION SECTORS – PICTURED IS A K. mikimotoi BLOOM DUNMANUS BAY, IRELAND (PICTURE: MARINE INSTITUTE)

Source data: MODIS (NASA) satellite reference, then Sentinel-3 (ESA) when available.

Methodology: The frequency and distribution of high biomass *K. mikimotoi* blooms were analysed over the French continental shelf from 1998-2012. Exploitation of Earth Observation in visible bands where the presence of *K. mikimotoi* bloom is confirmed have shown that this species has specific optical signature that allows distinction from other species. An algorithm has therefore been developed for *K. mikimotoi* blooms detection from satellite visible imagery (Jegou 2013, Sourisseau *et al.* 2016). To compute a map of the probability of actual presence of this algae, the optical characteristics of each water pixel are thus compared to the *K. mikimotoi* optical characteristics reference. The closer the characteristics, the highest the probability of detection.

Limitation: Detection is only possible for high biomass blooms. The actual toxicity of a potentially toxic species needs to be confirmed with ground sampling.

This probability mapping is a good estimation of the possible presence of *Karenia mikimotoi*, as proven by the indicator's detection of a HAB in offshore waters off the South West Coast of Ireland, two days before coastal observations of the bloom. Subsequent testing of the algae identified it as *K. mikimotoi.* (see Figures 1 & 2).

References: Sourisseau M; K. Jegou , M. Lunven , J. Quere, F. Gohin a , P. Bryere (2016). Distribution and dynamics of two Dinophyceae producing high biomass blooms over the French Atlantic Shelf. HARALG-1197.
Jegou K.(2013). Identification satellitaire des efflorescences de deux dinoflagellés, *Lepidodinium chlorophorum et Karenia mikimotoi*, grâce à leurs caractéristiques optiques

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