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## Optimal monitoring of the ocean surface by observing the transport crossroads

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In the context of tracer transport in the ocean, we introduce a quantity, the crossroadness [1], which allows identifying the optimal disposition of a set of locations in order to monitor a given ocean surface region. The optimization is performed so that these sites observe the largest amount of water coming from the region and, at the same time, monitor waters coming from separate parts of the ocean. These are key criteria when deploying a marine observing network. Considering surface circulation, crossroadness measures at any location the extent of the ocean surface which transits in its neighborhood in a given time window. When the analysis is performed backward in time, this method allows us to identify the major sources which feed a target region. The method is first applied to a minimalistic model of a mesoscale eddy field, and then to realistic satellite-derived ocean currents in the Kerguelen area. In this region, we identify the optimal location of fixed stations capable of intercepting the trajectories of 43 surface drifters. We then illustrate the temporal persistence of the stations determined in this way. Finally, we identify possible hotspots of micro-nutrient enrichment for the recurrent spring phytoplanktonic bloom occurring there. Promising applications to other fields, such as larval connectivity or contaminant detection are discussed.

[1] A. Baudena, E. Ser-Giacomi, C. López, E. Hernández-García, F. d'Ovidio, Crossroads of the mesoscale circulation, *Journal of Marine Systems* 192, 1-14 (2019).