Implementation of watershed modelling in the Litter-TEP service (Marine Litter Drift Monitoring in the NE Atlantic Shelf Region) to complement CMEMS data inputs.

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It has been considered for quite a while that rivers, coastal outlets and flytipping are the main input contributors to Marine litter. After their discharge into the sea, litter is then transported by currents and wind while sunk and/or disintegrated into micro marine litter, some pieces finishing their course at the coast where they wash ashore. Thanks to a Copernicus Marine Environment Monitoring Service (CMEMS) grant, ARGANS Ltd has developed a web-based service, called Litter-TEP, that aims to track marine litter from their source. The service is based on two segments, one Land unit and one Ocean unit, and the issue is with the former: The Land component is made of a parametric model of riverine macro litter discharge at sea which is based on hydrological information and socio-economics data. It feeds the Ocean unit, with drift models using ocean current, wave and wind forecasts from CMEMS to provide a 5-day running forecast of macro-litter density in the sea, potential beach stranding at the coast and, inversely, where a beach litter event is identified to provide the likelihood of where the litter entered the sea. Yet, by lack of real-time land hydrological data from free & public sources, the land-litter input model currently implemented in the service only relies on hydrological information from statistics based on 30 years of daily rivers flow data. Nota: if the hydrological data (river flows) is in open access for the European rivers on the Copernicus service, it is with a 30-day delay. To mitigate this shortage, we have implemented a water discharge model as a prototype; it is based on HYPE v.5.11.2 from SMHI to calculate daily estimation of rivers flow from near real time rainfall (from NASA) & temperature data (from all national Met Offices) and thus to link the volume of litter coming into the sea to Meteorological events to have better estimates of litter's volume brought into the sea. The model has been validated for Ireland and is currently parametrized for other countries and regions. It shall be implemented in the next version of the LITTER-TEP.