

Environmental risk analysis of oil handling facilities in port areas. Application to Tarragona harbor (NE Spain).

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Diffuse pollution from oil spills is a widespread problem in port areas (fuel supply, loading/unloading activities). Traditionally, port-specific environmental risk assessment (ERA) tools do not normally include a representative (met- ocean) variability of the study area or the spatial component of risk. This study shows a method to assess the spatial and temporal environmental risk of oil handling facilities. The method comprises: i) identification of environmental hazards, ii) characterization of meteorological and oceanographic (met-ocean) conditions, iii) characterization of ERA scenarios, and iv) environmental risk assessment (Fig.1).

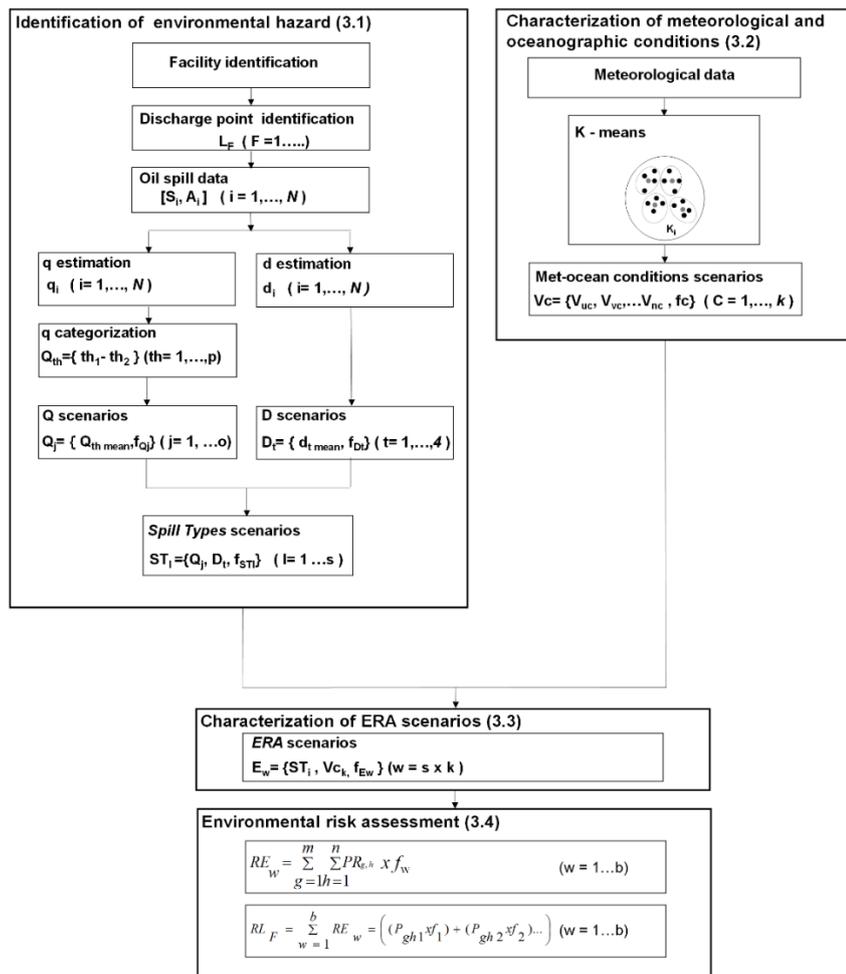


Figure 1. ERA analysis method for oil handling facilities in port areas.

The method was tested by its application at Tarragona harbor. Once facilities and discharge points were identified, discharge quantity and product density were estimated to define Spill Types (ST) on the basis of recorded past oil spills information. K-means technique was applied to an extensive meteorological and oceanographic database defining the most-probable local met-ocean conditions. ERA scenarios were defined (combination of ST and met-ocean conditions). Finally, the environmental risk (ER) for each ERA scenario was estimated using numerical models and its integration generates the total ER discharge point, producing probabilistic risk maps of potentially affected areas (Fig. 2).

The methodology allow to obtained precise results constituting an advance procedure to design monitoring programs in order to assess the potential impact of any oil handling activity. Moreover, the spatio-temporal distribution of risk allows to stakeholders identifying potentially threatened local environmental and community resources (economic, societal or environmental goods), providing decision-making support for the development of contingency plans.

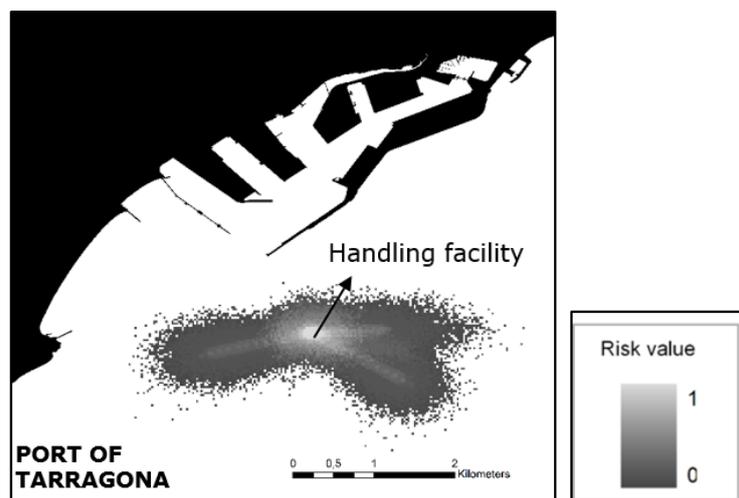


Figure 2. ER values and potentially affected area for a specific facility at the port of Tarragona.