

S U M M A R Y

This thesis presents diverse theoretical and practical applications of the ERS 1/2 and RADARSAT satellite images of the Synthetic Aperture Radar SAR sensor (near 330 images in the Northwest Mediterranean NWM and 980 in European coastal waters). Other types of satellite images were used to study the marine pollution and dynamics of the NWM and other European areas. The collection of the SAR images obtained on periodic form, between 1996 and 1998 generally by the Clean Seas European project, also by the Oil Watch and the ERS-1/2 SAR Exploitation Study in Catalonia projects constitutes the principal source of information. The geographical area of interest includes the NWM maritime zone: the Balearic Islands - the Ebro Delta - the Cape of Creus - the Gulf of Leon - Marseilles.

During the presented studies, we elaborated a thematic collection of the SAR (full and detailed fragments) images of the almost 300 oil spills and of the 42 coastal plumes detected in the NWM during 1996-1998; also thematic maps and the statistical analysis of their topologic characteristics and of their temporary/spatial occurrences were elaborated.

The area of the all accidental spills and plumes that took place during 1996-1998 in the NWM was also estimated (the diameter is 146 km and its oil mass is 4.477 Tm). We made a comparative analysis of the Clean Seas project results obtained from different test zones (NWM, North Sea and Baltic). The statistical analysis of the occurrence of habitual smaller oil spills from the ships and of great marine accidents in European coastal waters in base of the results of the present work and of the historical information of the last 34 years, relating them to Zipf's law, is shown. The general conclusion is that the habitual smaller oil spills play a significant role in the overall marine pollution, due to their very frequent occurrence.

In the area of study of the dynamics of the NWM, we present the results of the topologic and spatial analysis of the vortices detected by the satellite sensors, the thematic maps, the comparison with the laboratory experiments, the quantitative analysis of the peculiarities of tide in different points of the NWM, the examples of the application of the multifractal analysis and also a practical method proposed in order to distinguish the sea surface structures of different origins.

The obtained results have allowed to obtain a general and statistically justified vision of the level of the marine pollution of the NWM, as well as in other European coastal waters. It was also possible to obtain quantitative information on the complex superficial dynamics of the NWM, which can be useful to quantify the capacity of surface diffusion of the ocean.