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OIL BURIAL AND WEATHERING IN THE BEACH INTERTIDAL ZONE: A CASE STUDY IN GALICIAN COAST (NW SPAIN) AFTER PRESTIGE OIL SPILL

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On November of 2002, the Prestige oil tanker sank at about 240 km west of Galician coast (NW Spain). Approximately 63000 tonnes of fuel oil nº2 spilled. This incident caused the largest ecological disaster in Spanish history. During the following months, consecutive oil slicks reached a coast stretch of some 1900 km, reaching the Atlantic coast of France. The coast of NW Spain was the most affected area. Despite intensive cleaning in the beaches, large quantities of oil mixed with beach sand currently remains buried in the intertidal zone.

In January 2004, a field campaign was carried out on two of the most affected beaches (Nemiña and O Rostro), where 20 corers were extracted along beach profiles to asses the presence of buried oil. The study detected buried oil up to a depth of 2,38 m (maximum sampling depth) and allowed to establish four main types of physical appearance in buried fuel oil: Centimeter-size tar-balls coated with sediment, isolated particles of fuel oil of similar grain size than the sediment, fuel oil coating sediment grains and fuel-oil emulsions. Despite a great similarity in the sedimentological and geochemical characteristics, it was observed various distribution patterns of these types are related to the energy conditions of the beaches. In beach like Nemiña, subjected to low wave-energy conditions, the fuel oil remains buried for long periods of time and mostly transforms into coatings, giving a characteristic grayish tonality to the beach sand. In contrast, high wave-energy beaches like O Rostro with significant shorter the burial

times for the fuel-oil, tar-balls are transported with the sediment bearing significant abrasion. Based on this information, we established a conceptual model for burial and weathering of fuel oil in the beach intertidal zone. This model considers that the morphodynamic behavior of the beach is the main cause that determines the evolution of buried fuel oil in a beach.

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