The effects of extreme weather events on the bottom sediments during the dredging of the Port of Genoa

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Introduction: The particular meteorological characteristics of the City and the Port of Genoa (Italy) have been known since the 1970s [1] [2]; in fact, Genoa is located on the northern side of one of the most active areas of cyclogenesis in Europe, which produces frequent periods of unstable weather [3].
From the beginning of the dredging of the Port of Genoa in 2009, the city was hit by several severe weather events (flash floods). Due to the presence in the port of the mouths of the two principal torrents of Genoa (Fig. 1), the effects of these events on the mobilisation of sediments (both dredged sediments and acquired sediments from the torrents) during the dredging operations are presented in this paper.

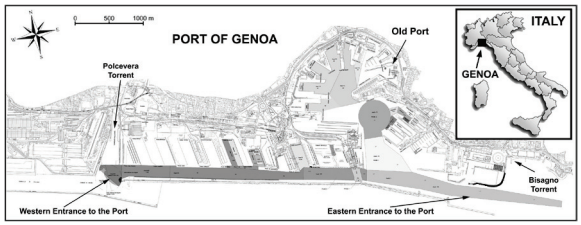

Fig. 1: *Location of the two torrent mouths and the dredging area of the Port of Genoa.*

Methods: Weather and sedimentological data and samples collected during and after the flash floods occurred in November 2009, 2010, 2011, and 2014 were analysed to quantify the influence of the events on the bottom sediments and consequently on the morphology of the bottom.

Results: Starting from the analysis of the bathymetry surveys carried out during the dredging of the port we can see the modification of the bottom morphology and how the influence of the stream flows is important on it.

Discussion: In the light of the findings of the observation of what happened during the floods of Genoa and its Port, some possible solutions to this problem, that allow to avoid the consequences of these events (such as the raising or the variation of the morphology of the bottom, with a consequent increase in the risk for the navigation), could be the creating of spillways, bypass and/or sediment traps along the river beds to facilitate and slow down the flow of water and sediments during these events, primarily protecting areas prone to landslide and flood risks.

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