Part II

Landslide in Coastal Area

Introduction by Crescenzo Violante

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Coastal areas are potentially subject to mass-wasting events over a range of magnitude and period of recurrence that account for active cliff recession, lateral collapse of coastal slopes, and sudden increase in sediment load in short coastal rivers (flash floods). These phenomena deliver significant amount of materials in the sea at intermittent time interval in the form of cliff debris, landslide accumulations, coarse-grained delta and as turbiditic flows. The resulting deposits are transient trough the shore zone and mostly redeposited at great depth, exposing the coast to wave action and ultimately to an irreversible loss of land over a human-scale periods.

Retreat of coastal slope is both produced by wave and weathering action. Although basal erosion is a critical factor for slope instability, precipitation and infiltration of waters resulting from rainfalls and groundwater can act in the upper part of the slope significantly contributing to coastal failure. The importance of wave action as eroding factor and of coastal seas as a sink for displaced materials, highlight the role of marine geological investigations for coastal landslide hazard assessment. Furthermore, the use of historical data is an important task in this matter particularly for assessing damage to property and infrastructures.

This session received eight papers dealing with different aspect of coastal landslides that occurred under the influence of both marine and terrestrial processes. Slope failure, mass wasting and floods are described in terms of physical changes, and on the basis of geologic, hydrologic and geotechnical features. Tools and methodologies are proposed to model and recognize landsliding features and occurrence.

Aringoli et al. hypothesize a mutual control of sea-level oscillations and tectonic uplift on a large landslide along the Adriatic coast with a deep sliding surface, encompassing the coastal and marine areas. The paper by Berov et al. illustrate the state of the art along the North Bulgarian Black sea coast whose features indicate a strong control by seismic activity, also confirmed by historical sources. Hydro-meteorological trigger on a French coastal landslide was identified by Bogaard et al. who proposed a conceptual water balance approach to show a link between landslide re-activations and oscillations in the rainfall-groundwater system. Physical modelling for landslide hazard mapping and statistical sea cliff susceptibility assessment are proposed by Olivier et al. and Marques et al. respectively, which indicate tools and methodologies for the management of coastal instability. Hazard-related seafloor features including large debris avalanches off Ischia island and Somma Vesuvius, and flood dominated fan-deltas off the Costiera Amalfitana, are illustrated by Violante that uses sea-land correlation to assess the stability of Napoli and Salerno coastal areas. Underwater geologic features are reported also by Pennetta and Lo Russo that indicate the occurrence of shore platforms as a main control on sea cliff erosion at Capri island. Finally, historical data have been used by Porfido et al., to reconstruct and classify, in terms of typology and magnitude, more than 100 flood events occurred along the Sorrento peninsula in the last five centuries.