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The Open-Air Laboratory Italy

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The Open-Air Laboratory is a novel concept developed by the EU-funded Operandum project (OPEn-air laboRatories for Nature based solutions to Manage Environmental risk) to co-design, implement and assess the effectiveness of Nature-Based Solutions (NBSs).

In this work we present the Open-Air Laboratory Italy (OAL-Italy) and discuss the application of the OAL as a framework for the development of innovative NBSs to mitigate the impact of hydro-meteorological hazards in present and future climate. By combining consolidated practices in an original multidisciplinary frame, the OAL-Italy deploys novel modelling strategies, laboratory measurements and targeted monitoring open-field campaigns. In three operational sites, the NBSs are implemented via a co-design, co-development and co-deployment approach based on a thorough interaction with key stakeholders. By describing the structure and the approach of the OAL we illustrate salient features of the methodology developed in Operandum that are instrumental for the replicability and the upscaling of the NBSs.

Presented results address the use of the NBSs to mitigate a range of hydrometeorological hazards such as coastal erosion, flooding, storm surge and salt wedge intrusion. Innovative NBSs tested and developed by the OAL include: deep-rooted plants installed on a river embankment to prevent levee failures, special plants that can live in high salt concentration and remove salt from the river mouth water, an artificial dune and marine seagrass to mitigate the impact of storm surges and coastal erosion. We argue that the OAL constitutes an unprecedented holistic effort towards sustainable land management, adaptation to climate change and the acceptance of Nature-Based Solutions.

OAL-Italy: Pulvirenti B., Aguzzi M., Aragao L., Bizzarri D., Bucchignani E., Cacciamani C., Carlone T., De Nigris N., Leo L.S., Löchner A., Mannocchi M., Morelli M., Pinardi N., Porcù F., Rianna G., Robello P., Sorolla A., Tavaroli F., Toth E., Umesh P. A., Unguendoli S., Valentini A., Verri G., Di Sabatino S.