MaTer - Pianeta Terra-Mare (Planet Earth and Sea)
an interactive and multidisciplinary approach to Earth and Marine sciences

Piangiamore G. L.1, Fanelli E.2, Furia S.2, Garau D.3, Merlino S.4, Musacchio G.5, Centineo M. C.6
1INGV Porto Venere, Italy; 2ENEA La Spezia, Italy; 3ISA 10 Lerici, Italy; 4CNR-ISMAR La Spezia, Italy; 5INGV Roma; 6Ass. Mamme del Momento Tellaro, Italy

Introduction
Recent studies demonstrated that in scholar-textbooks Earth and Marine Sciences are not properly treated. These arguments are generally multidisciplinary and experimental and the improvement in the field of these sciences is strictly linked to technological advancement. The school cannot keep up with the huge advances in knowledge of the last 20 years which results in such inadequacy. In this context, in 2014-15 three Italian Research Institutes (INGV, ISMAR-CNR and ENEA-CRAM) supported the Scholar Institute of Lerici (ISA 10, Liguria, Italy), encompassing from nursery to junior high schools schools (3-14 years old children/students) to develop the project MaTer - Planeta Terra-Mare (Planet Earth and Sea). The project aims to promote and favor the diffusion of a technical-scientific culture and to sensitize scholars towards problems occurring in marine and terrestrial environments, settling in a sustained attitude to exploitation of natural resources and consciousness to natural hazards such as earthquakes, floods and landslides, quite common in this Italian region. MaTer was organized in two main modules: one related to Geosciences (Planet Earth, Fig. 2) and the other to Marine Sciences (Planet Sea, Fig. 1.a and 1.b). MaTer has been considered as one of the best projects funded by MIUR (Italian Ministry of Education, University and Research) inside the Dissemination of Scientific and Technological Culture call for the year 2014.

Planet Sea: Un mare di risorse (A sea of resources)
This module was developed by ENEA. Here, students faced various biological and ecological aspects of the marine life. They familiarized with basic concepts such as ecosystem function and biodiversity. Different focused and practical lessons were offered concerning marine food webs, both in the benthic and pelagic domains, the importance of marine biodiversity and the present threats for its conservation, phytoplankton, seaweeds and seagrasses or organisms found on the beach. Specific lessons and also seminars were carried out on how the Mediterranean and the oceans in general, are changing, on biological invasions (specifically on the so-called “Lessepsian invasion”, i.e. organisms entering from the Red Sea into the Mediterranean) and on the effects of ocean acidification on bioconstructors, such as encrusting algae, bryozoans or corals. All lessons were realized in a pleasant setting, with direct experience and observation, contact with marine organisms and story-telling by ENEA researchers. Still, students produced their own exhibition after the learning path was completed.

Planet Earth: Piovono idee! (Cloudy with a chance of ideas!)
Natural hazards are developed through an interactive learning experience on hydrogeological risk and climate change which is the result of a research by INGV and ConUnGioco Onlus, following a stimulating didactic/communicative model. The exhibition emotionally involves the participants to raise awareness on the social dimension of the natural risk reduction. On each stand the scientific session explained the geological phenomena; while the experience session was meant towards actions to be taken towards risk mitigation. Children, experts and scientists built together the interactive workspaces, games and educational laboratories exploring scientific concepts and their consequences on land and inhabitants. The learn-by playing approach instilled appropriate behaviors. The project was also a “peer-education experiment”, where students of the High and Middle School had played the role of guides in the interactive paths during the guided visits for classrooms and public in general.

Seminars for teens and adults
A series of multidisciplinary a scientific conferences, and seminars targeted to teenagers and up and open to the public, were also organized during the opening and closing weeks of the project, inside the “Week of Planet Earth” 2014 and 2015. Different Italian researchers, involved directly or not in MaTer, held talks on the most intriguing themes of natural hazard, marine ecology, oceanography, geology and geophysics (i.e., ocean acidification, deep-sea ecosystems, marine litter, magnetic and solar storms, seismic and tsunami risk, biological invasions, etc.).

Impact of the project
MaTer reached ca. 1000 users and had a good feedback from teachers, scholars and general public, supported by questionnaires, press releases and notes on local newspaper. Through the website, where all project’s materials have been uploaded, MaTer is expected to reach a broader scholar community, outside its local context. The project was a good example of cooperation of different territorial institutions and associations, working together to promote the culture of prevention, involving future citizens to reflect on the values of appropriate behaviors and best practices towards an ethical and sustainable interaction between human activities with the geosphere disaster risk, pointing out that human behavior is the principal factor in the degree of vulnerability and the likelihood of disasters taking place. We would like to thank Fabrizio Rozzi, the headmaster of ISA 10, for kindly allowing us to realize all of these activities.