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The high resolution combined topographic model of Panarea island (Aeolian islands, Italy)

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Aerial digital photogrammetry, aerial laser scanning and multibeam bathymetry, play a fundamental role to produce Digital Terrain Models (DTM) of sub-aerial and submarine areas. The integration of these survey techniques is crucial to provide accurate and homogeneous digital elevation models along narrow coastal zones that often cannot be adequately surveyed due to the logistic limitations to collect bathymetric data in shallow water.

In this paper, three aerial photogrammetric surveys, two multibeam bathymetry and a survey are analyzed and integrated together to generate the first 3-D high resolution DTMM (Digital Terrain and Marine Model) of the volcanic island of Panarea (Aeolian islands, Italy). This is an active area that underwent to a submarine gas eruption on November 2002, producing impacts on the environment and potential hazard for the local population. Our DTMM shows the morphological features of this volcanic area at resolution of 1 m average grid size and a maximum elevation error of 1 m. Here we show and discuss our integrated DTMM co-registered in the same reference system, devoted to improve geophysical and geomorphological studies of this active volcanic island for hazard reduction programs.