



From Sand to Rock: a teaching activity to introduce beach dynamics.

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The Italian coastline is about 7,500 km long; approximately 53% of the coastlines are low or deltaic coastlines, while 3,240 km were mainly composed of sand or gravel beaches. Most of the Italian coastal environment suffers from intense and growing urbanization, tourism and industry pressure, which could partly explain that 42% of Italian beaches experience erosion.

Terracina is situated Lazio (Central Italy), a region strongly impacted by coastal erosion, and for this reason we organized a teaching activity, carried out with fourth year high school classes, in order to help students to understand sand beach dynamics, acquisition of geology issues and land conservation and preservation skills. We decided to focus our activity on the mineralogical composition of beach sand in order to relate beach formations with the geological evolution of the territory. Sand beach minerals were used as tracers in order to support students to understand dynamics that influence beach formations. In addition to mineral characteristic recognition, this activity allows us to introduce the beach balance concept and the phenomena that regulate sediment balance, in order to allow students to consider beaches as a resource which needs to be preserved. Sand mineralogical composition data is treated in a worksheet to elaborate simple statistical analysis in order to recognize the mineral composition of Terracina beach sand's rock sources. This exercise allows students to find relationships between regional geology and beach sand's composition. Finally, statistical evidence could be compared with geological maps of the area in order to find the probable provenance of sand's rock source and rocks recognition thanks to related morphologies.

Our main purpose was to help students to understand that beaches are dynamic systems subject to anthropogenic pressure and for this reason they needed to be preserved. Proposed teaching activities involve topics related to students' living territory and to introduce pupils to the importance of observing environmental characteristics and trying to relate them to geological processes in action.