



In the footsteps of Darwin at Santiago (Cape Verde Island): new insights from a field reappraisal of the (white sedimentary layer)

Giovanni Sarti (1), Federico Bertocchini (2), Guido Chiesura (3), Monica Bini (1), Antonio Cascella (4), Adriano Ribolini (1), Etta Patacca (1), and Claudia Casacchia ()

(1) University of Pisa, Science, Earth Department, Pisa, Italy (sarti@dst.unipi.it, +39 050 2215800), (2) Garassino s.r.l., Bierregi, Grosseto, Italy, (3) Spoleto, Perugia, Italy, (4) Istituto Nazionale di Geofisica e Vulcanologia, Pisa, Italy

The volcanic island of Santiago de Cape Verde was the first stop of Darwin during his circumnavigation on board of the Beagle vessel (1832). The exploration of Santiago played a fundamental role in the growth of his interest for geology. During the three weeks spent on the island, Darwin had the opportunity of doing many pioneering and insightful observations around the morphology and structure of the basaltic platforms. He was also very impressed by a white fossiliferous layer. This horizon, few meters thick, is sandwiched in between two black volcanic units and outcrops extensively along the coastal cliff in the southern part of Santiago. Darwin rightly identified the marine depositional origin of the white layer (Darwin's old beach) observing that the same fossilized shells and algae were still living in the beaches of the island. In 2008, 2009 and 2102 under the auspices of the scientific project "Darwin at Santiago de Cape Verde Island" three expeditions have been performed on the footsteps of Darwin. The firsts two missions have been focused on the mapping and characterization of the basaltic units while the third has exclusively dealt with the facies analysis of the white sedimentary layer. The main goal of this study is to revisit, by a modern sedimentological, stratigraphical, and geomorphological point of view, the white old beach sequence described by Darwin in 1832. The first results display a very complex and fascinating geological history, largely grasped by the observations of Darwin, driven by the interplay among volcanic, tectonic and sea level changes factors. The old beach sequence (likely Pleistocene in age) is composed of two main transgressive depositional units separated by an angular erosional unconformity. This is a first important new topic enriching the Darwin's observations. The unconformity is well exposed along the small Quail island cliff, located about 1 km seaward of the Praia harbour. The unconformity divides sandy fossil-rich deposits, characterized by the abundance of Oyster colony and Turritella, from a white limestone/sandstone layer that commonly shows at its base accumulation of rodholits (the "Nulliporae" of Darwin). This obviously implies that a significant chronological hiatus is recorded in the section. As a whole the white limestone/sandstone layer is organized in a fining and deepening upward sequence that is abruptly truncated by a subaerial basalt unit in the Eastern side of the Praia Harbour and by a subaqueous pillows lava unit to the West. In addition the limestone/sandstone layer outcrops patchily at different quotes, from more than 30 m above sea level down to plunge below the sea. Ours study highlights how the white sedimentary layer, that so much aroused the curiosity of Darwin, records more than one depositional event. At least the position of four palaeoshores can be identified, evidencing how the island undergone to several phases of relative sea-level variations driven by eustatic and/ or tectonic factors.