



Parma 16-19 settembre 2019

ABSTRACT BOOK

a cura della Società Geologica Italiana



Congresso
SIMP-SGI-SOGEI 2019

Il tempo del pianeta Terra
e il tempo dell'uomo:
Le geoscienze fra passato e futuro



The Ganj Ophiolitic Complex reinterpreted as a Late Cretaceous volcanic arc: implications for the geodynamic evolution of the North Makran domain (SE Iran)

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Keywords: Makran, Neo-Tethys, Late Cretaceous geodynamic.

The Makran accretionary prism (SE Iran) record a Cretaceous – Present day complex geodynamic evolution, resulting from the convergence between the Arabian and Eurasian plates and the subduction of the main Neo-Tethys Ocean and associated minor oceanic branches. The North Makran is the innermost structural domain of this accretionary prism and it consists of an imbricate stack of tectonic units representing deformed remnants of both oceanic and continental margin domains. In turn, the Ganj Complex represents the structurally innermost tectonic unit of the North Makran and it is commonly interpreted in literature as an ophiolitic complex.

We present new structural, stratigraphic, paleontological, and petrological data on the Ganj Complex with the aim of better defining its geological features and its tectonic significance within the Makran accretionary prism. This Complex is dismembered in several tectonic slices bounded by transtensive- to normal- high angle faults; however, its stratigraphic succession can be broadly reconstructed through detailed field and laboratory observations. The succession is more than 3000 m-thick, and it consists (bottom to top) of a sheeted dyke complex showing a transition to a volcano-sedimentary sequence consisting of massive and pillow lava flows with intercalations of sedimentary rocks (mainly arenites). This sequence shows a gradual transition to calcareous turbidites bearing Turonian – Coniacian nannofossil assemblages. The Ganj Complex is unconformably covered by a mainly terrigenous, Eocene – Oligocene stratigraphic succession. Petrographic analysis shows that arenites intercalated in both the volcanic series and its sedimentary cover have an intrabasinal nature. These rocks are characterized by a mixed volcanoclastic-carbonatic framework, where abundant volcanic and sub-volcanic lithic fragments occur along with mudstone and wackestone clasts, as well as bioclastic fragments. Geochemical data indicate that the volcanic and sub-volcanic rocks consist of calc-alkaline and island arc tholeiites bearing subduction-derived chemical imprint, including minor adakite-like components.

Our multidisciplinary study indicates that the Ganj Complex represent a Late Cretaceous volcanic arc, likely built-up in a relatively shallow marine setting along the rim of a continental margin dominated by a carbonate sedimentation. The present-day structural position of this Complex suggests the existence of a volcanic arc onto the southern margin of the Lut continental block during the Late Cretaceous. In particular, the Ganj volcanic arc seems to be related to the subduction of the oceanic lithosphere of the North Makran basin rather than to the subduction of the main Neo-Tethys Ocean. Our results thus provide significant constraints for the geodynamic evolution of the Arabia and Central Iran transect during the Late Cretaceous.