

PS Reservoir and Seal Potential in a Young Oceanic Basin: The Vavilov Basin (Central Tyrrhenian Sea)*

Marzia Rovere¹, Fabiano Gamberi¹, Michael P. Marani¹, Federico Pittaluga¹, Elisa Leidi¹, and Alessandra Mercorella¹

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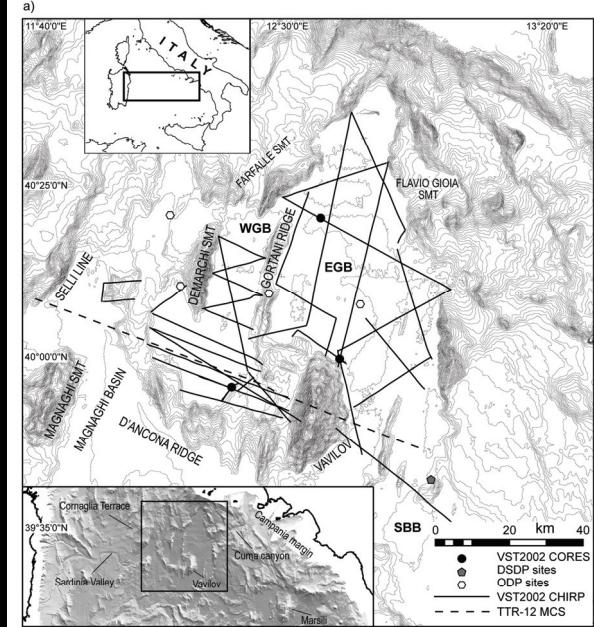
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Reservoir and Seal Potential in a Young Oceanic Basin: The Vavilov Basin (Central Tyrrhenian Sea)

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The Vavilov basin is a young oceanic basin floored with ~ 4 Ma oceanic crust, average depth is 3.500 m, it is bounded to the North, West and East by several seamounts and structural ridges, with variable heights above the seafloor. The Vavilov volcano, lying at the southern end of the Gortani basin, together with the Gortani structural ridge, separate the basin into two sub-basins: the western Gortani (WGB) and the eastern Gortani basins (EGB), see Fig. 1 on the left. Geophysical and geological data allowed to constrain the presence of 4 acoustic transparent layers (ATLs) intercalated with coarser grained turbiditic layers (TORB) (Fig. 3a). The ATLs are composed of very fine grained sediment (95-100% mud, Fig. 2), are completely structureless (Figs. 3b, c), contain no foraminifera tests and are interpreted as muddy turbidites. The TORB unit is composed of several thin (20 cm average) sandy turbidites (very fine to fine, occasionally medium sand, X-rays in Fig. 3d) capped by their associated mud. ATL1 and ATL2 are the most recent stratigraphic units, they overlie the TORB unit, and are thinner than the older ATL3 and ATL4 (Fig. 4). All the seismostratigraphic units have been correlated over the basin using the CHIRP profiles (Fig. 1 for positioning), they are arranged in several depocentres (Figs. 5-9) and can be described as turbidite units within a modern confined system.

DEPOCENTERS

The cumulative average thickness of the 4 ATLs varies from being below the resolution of the data to one meter to 30 m. TORB unit thickness varies from 1 to 15 m. All the units share two principal distinct depocentres in the eastern and western portions of the Gortani basin and one more focalized depocentre in the northern termination of the Southern basin (SBB in Figs. 5-9). Since we hypothesized, as the principal source area the Campania margin (Cuma canyon in Figs. 5-9), the depocentre in SBB is interpreted to be the effect of flows deflected to run parallel to a bounding slope (the lower continental slope itself). TORB unit reaches its highest estimated thickness in the northern part of EGB (Fig. 7), where the basin was ponded by the structural confinement and was fed by several slope channel-canyon systems. The EGB represented a silled sub-basin at the time of emplacement of unit TORB and the majority of the sediment carried to the Vavilov basin was trapped and deposited there. As an evidence, core VST02-62, which is located in the WGB, shows a finer grained TORB unit, probably suggesting deposition from the lower density, late phase flow part of the same flow that with higher density is registered in cores VST02-64 and VST02-63 that are located in the EGB. On the contrary, the ATLs units show a higher efficiency with less evidence of ponding. The only exception is ATL4 that appears to be ponded in the WGB, but the mapping of ATL4 is less accurate because of the resolution of the geophysical data and the absence of the base of this unit in the sample data.

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