

Table. S1. Geological information and related seismic stratigraphy of interpreted seismic units (SUs).

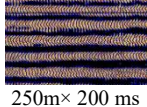
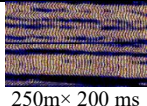
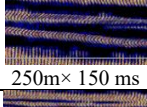
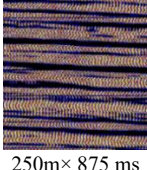
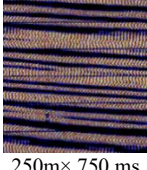
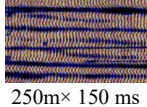
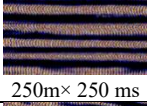
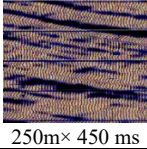
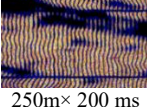
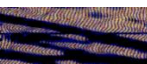
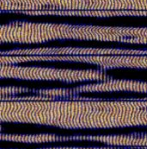
Seismic Unit (SU)	Seismic Facies Subunit	Formation	Lithology	Age	Reflection Geometry	Reflection Amplitude	Reflection Period	Seismic units Example
SU1	SU1-a	AS	Fine Sand, Sandy shale	Pleistocene - Holocene	Continuous-Semi continuous Horizontal Parallel	Low to High	20-35 ms	 250m× 200 ms
	SU1-b				Discontinuous-Continuous Parallel	Low to Medium	20-30 ms	 250m× 200 ms
	SU1-c		Shale and Silty shale		Continuous Parallel	High	40-50 ms	 250m× 150 ms
	SFU-d		Inter bedding of Fine Sand, Shale, Silty Shale		Continuous-Semi continuous Parallel	Low to Medium	30-70 ms	 250m× 875 ms
SU2	SU2-a	PG	Silty shale and Interbedded shale	Pleistocene	Continuous Parallel	Low Medium High	30-60 ms	 250m× 750 ms
	SU2-b		Fine sand, shaly sand		Semi continuous-Discontinuous Parallel	Medium to High	30-60 ms	 250m× 150 ms
SU3	SU3-a	PG	Shale and Silty shale	Pliocene	Continuous Horizontal Parallel	High	25-50 ms	 250m× 250 ms
	SU3-b		Silt, Sand, silty Marls and silty shale		Discontinuous-Continuous Sub Parallel	Low to Medium	20-50 ms	 250m× 450 ms
	SU3-c		Silty Marls, Shale		Discontinuous-Sub Parallel	Low	30-45 ms	 250m× 200 ms
SU4	-	GS- SCH-BIS	Shales and marls interbedded with siltstones, carbonates, and minor gypsum	Miocene	Continuous-Discontinuous Parallel Sub Parallel	Medium to High	20-40 ms	 250m× 100 ms
SU5	-	SCA-FUC-MAS	Carbonates	Mesozoic-Paleogene	Discontinuous-Continuous Sub Parallel	Low Medium High	20-50 ms	 250m× 400 ms

Table S2. Seismic interval velocities for the Marche succession (m/s, two-way time). The final column lists the velocity values used for depth conversion in this study. Note: The final velocity model was constructed using average interval velocities derived from well-tie analysis of the Tamara well's sonic log; values derived in this study are marked with an asterisk (*).

Age	Lithology	Formation	Bally et al., 1986	Maesano et al., 2013	Maesano et al., 2023	Montone & Mariucci., 2023	This Work
Holocene	Shale, Silty shale	AS	1962	2010	1849	1800-2750	1976*
Pleistocene	Fine sand, Sandy shale, Shale						
Upper Pliocene	Shaly sandstone, shale	PG	2767	2980			2200*
Lower Pliocene							2800*
							3000*
Upper - Middle Miocene (Messinian)	Shale- Anhydrite	GS	3777	3395	3545±500	4200-4900	3400
Lower Miocene	Shale- Marl- siltstone± Limestone	SCH- BIS	3060	4151		2400-2800	
Oligocene	Limestone- Marl	CSS- SCA	3080				3800
Cretaceous	Pelagic limestones and marly limestones with chert,	SCA	4726	5600	4700±600	4900- 5400	4200
Jurassic- Cretaceous	Pelagic limestones, cherty limestones and marls	CDC- FUC	5795		5400±600		5200
Jurassic	Massive or coarsely bedded peritidal limestones	MAS	6037		5900±500		6000
Triassic	Gypsum–anhydrites and dolostones, with alternating dolostones and packstone- grainstones	Dolomia Principale- BF	6195	6100	6000±400		6100