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Evidence for a variable paleomagnetic lock-in depth in Holocene sediments from the Salerno Gulf (Italy)

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We report on a high-resolution paleomagnetic and rock magnetic study of two adjacent marine piston cores from the Salerno Gulf (Italy). The cores recovered a sedimentary sequence spanning the last ca. 6000 years and include a thick (ca. 1 m) pumice layer produced during the Vesuvius eruption of 79 AD. Rock magnetic and lithostratigraphic data provide tie-points for a detailed correlation between the two cores. Paleomagnetic data from the two cores allow the determination of a well defined characteristic remanent magnetization (ChRM), with paleomagnetic inclination and declination also showing a very similar stratigraphic trend, with distinct features that can also be unambiguously correlated between the cores. However, the comparison of the various data sets points out that the paleomagnetic lock-in depth in the two adjacent cores varies through the stratigraphic sequence. We discuss the implication of such results for assessing the potentiality of high-resolution paleomagnetic studies in dating sedimentary sequences on the basis of paleosecular variation (PSV) of the geomagnetic field. In the studied case the relative difference in the lock-in depth cause "spreading" of the paleomagnetic age models at a century scale. We think this may represent a realistic estimate for PSV age uncertainties in Holocene sequences with relatively high sedimentation rates (10-100 cm/kyr).