Rock magnetic signature as a result of gas hydrate dissociation off southwestern Taiwan

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Marginal areas off southwestern Taiwan have been widely considered a high potential reservoir of gas hydrates based on several geophysical, geological, and geochemical investigations since the past decades. First gas hydrate sample has been collected on 21 June 2018 during the cruise MD214 at the core site MD18-3542 on the South Yung-An East Ridge. In the study, we focus on magnetic properties of this MD core. The most attractive feature in the magnetic susceptibility is an abrupt drop recorded at about 4 meters core depth. To clarify and identify the dominant magnetic mineral in the core, hysteresis loop parameters were first measured and then presented on the Day Plot, and further the X-ray diffraction analysis was applied to the selected core samples. Based on the magnetic results, the clear drop in the magnetic susceptibility is related to the change of dominant magnetic minerals in core sediments. Before about 4 meters core depth, the dominant magnetic mineral remains detrital magnetite. Below the depth, however, core sediments should have been infected by methane released by gas hydrate dissociation. Authigenic greigite and pyrite have become dominant, and therefore low magnetic susceptibility appears below 4 meters core depth.