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Lacustrin magnetic parameters reveal the last 3,000 years environmental variation of the Ilan Plain, northeastern Taiwan

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We discuss the paleo-environmental variation of the Ilan Plain in northeastern Taiwan for the last 3,000 years by using lacustrine magnetic records obtained from Meihua Lake (the MHL-5A core; 24˚38.58' N, 121˚43.96' E) and Longtan Lake (the LTL-9C core; 24˚47.70' N, 121˚44.40' E). The magnetic parameters analyzed in the study include magnetic susceptibility (χ), SIRM (saturated isothermal remnant magnetization), ARM (anhysteretic remnant magnetization), ARM/χ, and ARM/SIRM. The most notable feature in the magnetic records of both cores is an anomaly appeared at ∼1,800 years. In the MHL-5A core, the parameters representing magnetic abundance variation (χ, SIRM, and ARM) are relatively higher before ∼1,800 years and become lower after the time. On the contrary, the magnetic abundance parameters are lower before ∼1,800 years but become higher after the time in the LTL-9C core. Besides, for the last ∼700 years, the magnetic parameters in the MHL-5A core show a clear period variation. Also in the LTL-9C core, this period variation could be observed though the period is relatively ambiguous. Moreover, the magnetic grain size parameter ARM/SIRM shows that the grain size of magnetic minerals in both cores became finer gradually for the last ∼3,000 years. The reason could be preliminary deduced: The Ilan Plain is a flooding plain and the main river in the plain is a braided river, the Lanyang River. Before ∼1,800 years, the channel of the Lanyang River should be in the south of the plain (closer to the Meihua Lake). More sediment was brought into the lake by the flooding of the Lanyang River. After ∼1,800 years, the channel of the Lanyang River shifted northward (closer to the Longtan Lake), and therefore the input to the Longtan Lake from the flooding might increase. The period variation after ∼700 years could be roughly attributed to the rainfall effect. That is, precipitation variation resulting from the influence of the monsoon system might become significant for the last ∼700 years in the Ilan Plain.