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HEAVY MINERALS OF THE LOWER YANGTZE FLUVIAL REACH, CHINA, TO INTERPRET THE LATE QUATERNARY ENVIRONMENTAL CHANGE

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A type core ZX-1, collected from the southern bank of the lower Yangtze fluvial reach reveals a temporal variation in distribution of heavy minerals along the late Quaternary stratigraphic horizons. All heavy mineral assemblages in the core contain amphibole, epidote, zircon, rutile, and sphene. However, relative abundances and chemical compositions of some heavy minerals suggest two distinct sediment provenances.

Diagnostic heavy minerals in the late Pleistocene to early Holocene sections include garnet, staurolite, chloritoid, ilmenite, titanomagnetite, and tremolite and indicate a provincial metamorphic source terran, namely the Maoshan and Tianmushan highlands, west of the Yangtze delta plain. Heavy minerals in the mid- to late-Holocene sections are largely devoid of metamorphic minerals. Rather, they consist of a unique variety of clinopyroxenes, including augite and pigeonite not seen in the lower section, that likely derive from high temperature extrusive and intrusive igneous rocks along the Yangtze platform.

Throughout the core, heavy mineral distributions corroborate previous studies of the region that show paleoenvironmental changes in the southern Yangtze fluvial plain: 1) an oxidizing (soil formation) environment prior to ~10,000 years BP; 2) an open coastal setting during ~10,000 – 7,000 year B.P; 3) a progressively reducing lagoon – fresh

water marsh environments between 7,000 – 4,000 years BP; and 4) tectonically-induced southward migration of the Yangtze river channel to its present position, after ~4,000 year BP

Clearly, sediment sources of the lower Yangtze fluvial region have fluctuated since the late Pleistocene. Construction of the 3 Gorges-Dam will inevitably change the Yangtze fluvial regime and thus alter sediment influx to the lower Yangtze river reach and its estuary. The present research result can be used as a pre-Dam study to provide a useful baseline against which to measure the impact of the dam on the variation of sediment sources to this vital lower Yangtze reach.