



## **0.1 High-resolution record of Holocene Asian climate Change revealed from mud wedge deposit in the East China Sea inner shelf**

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**Abstract:** Holocene mud wedge or clinoform deposits have been found in many off-shore floors on the earth, which have close relationship with river discharge and along-shore current delivery. The mud wedge or clinoform deposits in the East China Sea inner shelf is distributed off the coast from the southern Qiantang Estuary of Zhejiang Province to the Minjiang River Mouth of Fujian Provinces reaching the northern Taiwan Strait and extending about 800 km from the Yangtze River estuary. The mud wedge has been formed since high stand of sea level during the Holocene and has been delivered under alongshore current driven by north-eastern winter monsoon. High resolution sub-bottom seismic profiles revealed that mud wedge is thick near coast and become thin off shore, which ranges from 40m between 20 and 30 m water depth to less 1 m between 50 and 90 m water depth. The mud wedge sediment is homogeneous and has brownish grey color. Analysis results of grain-size show that the sediment is mainly composed of clay and silt with sedimentary type of clayey silt. Sand in the sediment is very rare. Mineral composition in the sediment further confirms that sediment dominantly has Yangtze River origin.

According to AMS<sup>14</sup>C dating and high-resolution grain size analysis for piston cores DD2 located in northern mud wedge the grain size distribution curve was obtained. 9 abrupt grain size increase was noticed from the upper core formed in recent 2 ka BP, with each corresponding well to the low-temperature event in Chinese history, which presumably indicates the Asian Winter Monsoon periodically strengthened, including

the first-revealed maximum temperature lowering event at around 990 a BP. In addition, finer grain size section in core DD2 agree well with the Sui and Tang. Dynasty Warming Period (600-1000 a AD). The little Ice Age can also be identified in the core. It started around 1450 a AD and was followed by subsequent cooling events at 1510, 1670, and 1840 a AD. AMS<sup>14</sup>C dating and high-resolution grain size analysis for piston PC6 collected from middle section also were utilized to rebuilt the Holocene history of the Asian winter monsoon. Except for that relationship between the Asian winter monsoon sudden strengthening and abrupt grain size increase was revealed. A good correlation between sunspot change and the grain size of suspended fine population suggests that one of the primary controls on centennial- to decadal-scale change the East Asian Winter Monsoon in past 8 ka is variations of sun irradiance, in other words, East Asian Winter Monsoon in past 8 ka increased in intensity when the numbers of sunspots decreased.

**Key words:** Holocene Mud wedge, East China shelf Sea, Asian winter Monsoon, Sunspots.