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Temporal and spatial distribution pattern of the marine-brackish-water bivalve *Waagenoperna* in China and its implications for Triassic–Jurassic transition climate and palaeogeography

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Waagenoperna was a genus of epi-byssate, marine to brackish-water/lithoral bivalves. However, new data reveal that some species of Early Jurassic *Waagenoperna* (i.e. *W. lilingensis*, *W. mytiloides* and *W. pernoformis*) show a wide distribution in the areas southwest of the Shanghai–Altay Mountain Range, including parts of southern China. The sediments hosting these bivalves are intercalated with non-marine strata which generally yield coal. The geographic and stratigraphic distribution patterns of *Waagenoperna* can not only aid in the correlation of the non-marine coal-bearing strata, spanning the Triassic–Jurassic transition, containing *Waagenoperna* and constrain their age to a higher resolution, but also particularly demonstrate that transgressions occurred, flooding the areas southwest of Shanghai–Altay during the Sinemurian. These extensive transgressions influenced the climate and changed the palaeo-topography of southwestern Shanghai–Altay: they ensured a humid climate and resulted in the formation of marsh and even paralic swamp environments. These environments allowed the flora and fauna to thrive and led to the accumulation of large quantities of organic matter that eventually formed coal and probably oil as well. Furthermore, the transgressions would have altered the salinity of lakes and changed the overall ecosystem, causing extinction of some fauna while others adapted and evolved.

