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Biogenic and abiogenic sedimentation

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Marginal seas are potentially more sensitive to climatic perturbations than the open ocean, and the high sedimentation rates in such seas have created a record of the terrestrial and ocean environment. In order to understand fluctuations in terrestrial and marine environments influenced by the East Asian monsoon during the last 42 kyr, we investigated sedimentation of biogenic and abiogenic components in core MD982195, collected from the northern East China Sea (ECS), one of the largest marginal seas in the world. The wide range of organic carbon (OC)/total nitrogen (TN) atomic ratios suggests a significant contribution of terrestrial organic matter (OM) in this core. TN content rather than OC content can be a proxy for primary productivity (PP) in the coastal–hemipelagic region. PP was fairly constant during 42–24 ka, except for high PP during 34–32 ka. PP decreased from 24 to 14 ka and then increased gradually to the present, with a broad minimum during 3–2 ka. Al, a good proxy for lithogenic matter, was positively well correlated with the abundance of nonarboreal pollens (NAP). Lithogenic matter and NAP were transported mainly from coastal lowlands. Large, millennial-scale fluctuations in sea-surface temperature and salinity did not always correspond to sedimentation pulses of OC and lithogenic matter. Sedimentation of biogenic and abiogenic components was more affected by sea-level change, which controls the positions of the coastline and river mouths and the presence of terrestrial environments on the exposed continental shelf. The Japan Sea is also sensitive to sea-level change because of the shallow sills connecting it to other ocean basins. These features are quite different from those observed in the South China Sea, where the marine environment is mainly controlled by wind direction and speed, although the marginal seas of the western Pacific have also been influenced by the Asian monsoon.