Impact of catastrophic natural events on accumulation of diatoms in sediments of Amur Bay, Sea of Japan

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The Amur Bay is an interior bay of extensive the Peter the Great Bay (Sea of Japan), located on zone of influence of various nature events, which often lead to catastrophic results on the coast and reflected in sediments (Fig. 1). The Razdolnaya River has significant impact on the sediment accumulation in the Amur Bay.
The study of sediments in the Amur Bay (Cores A12-4, A12-5, and LV66-3) using X-Ray Spectral Scanning were revealed layers with abnormally low bromine (Br) content which exclusively associated with marine organic matter. These layers were formed when the Razdolnaya River runoff enhanced input of terrestrial matter during extreme floods caused by tropical cyclones or typhoons (Astakhov et al., 2015; Kalugin et al., 2015). The time of formation of the layers coincides with known recorded extreme floods in the Vladivostok and the Razdolnaya River basin during the passage of typhoons, such us Irving (1979), Judy (1989), Melissa (1994). This observation was used to identify paleotyphoons in the shelf sediments with a homogeneous lithological composition.
Diatoms are a major component of the Amur Bay plankton ecosystem and abundant in sediments. The study of diatoms in the same cores (A12-4, A12-5, LV66-3) allowed us to reconstruct the conditions of sediment accumulation over the past 150 years (Tsoy et al., 2015; Prushkovskaya, 2019) and in the late Holocene (Prushkovskaya, Tsoy, 2019). Diatoms are a powerful indicator of environmental change because they respond rapidly to changes in many ecological characteristics. We analyzed sharp drops in the number of diatoms in studied sediment cores over the past 150 years. It was found that the drops coincide with low Br content associated with extreme floods and typhoons. It is noted that the intensity and frequency of typhoons has been increasing since the 1960s in the Amur Bay due to global warming. In the sediments that have formed the last 5000 years noted different frequency of minima content diatoms coincided with corresponding flood signals (Astakhov et al., 2019). The minimum diatom concentrations in the late Holocene sediments also were at the same time with paleofloods and paleotyphoons in the adjacent areas (Bazarova et al., 2018; Lyaschevskaya, 2016; Ganzei et al., 2015). During warmer periods of the late Holocene, the frequency of diatom content drops increases, during cold periods –decreases. These observations will be used in future studies to recognize extreme events in the past.
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Keywords: diatoms, Amur Bay, late Holocene, accumulation of sediments

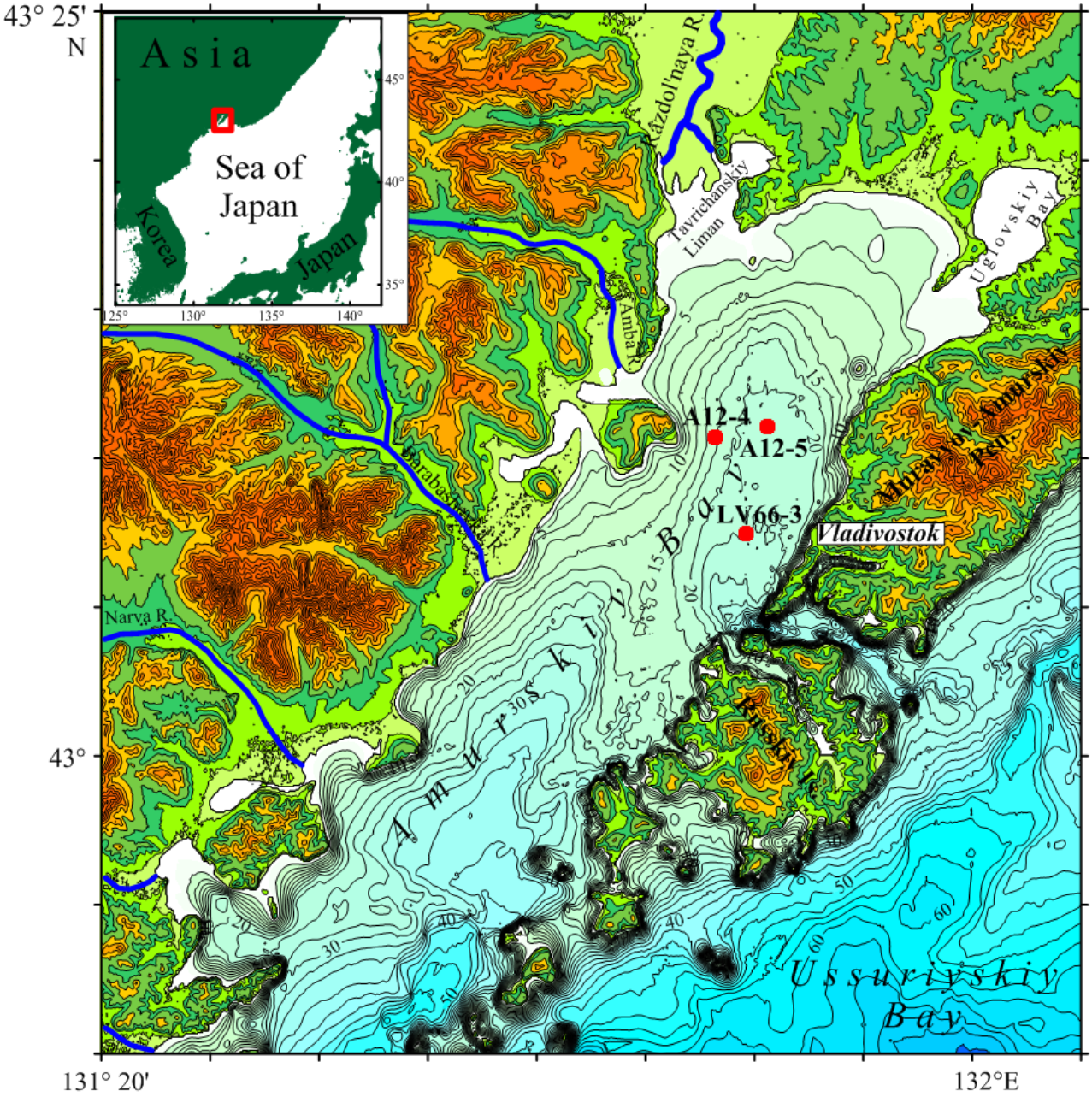

Fig. 1. Geographic locations of the studied cores A12-4, A12-5, and LV66-3 from the Amur Bay, Sea of Japan

