

EGU22-10360

<https://doi.org/10.5194/egusphere-egu22-10360>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## The global dataset of Phanerozoic glendonites and paleogeographic reconstructions

Victoria Ershova<sup>1,2</sup>, Mikhail Rogov<sup>2</sup>, **Carmen Gaina**<sup>3</sup>, Oleg Vereshchagin<sup>1</sup>, Kseniia Vasileva<sup>1</sup>, Kseniia Mikhailova<sup>1</sup>, and Aleksei Krylov<sup>1,4</sup>

<sup>1</sup>Saint Petersburg State University, Regional geology, Saint Petersburg, Russian Federation (ershovavictoria@gmail.com)

<sup>2</sup>Geological Institute of RAS, Moscow 119017, Russia

<sup>3</sup>Centre for Earth Evolution and Dynamics, University of Oslo

<sup>4</sup>VNIIOkeangeologia, 190121, St. Petersburg, Russia

Glendonites are carbonate (mainly calcite) pseudomorphs after metastable ikaite ( $\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$ ); Glendonites have been found worldwide in Paleoproterozoic to Quaternary sediments. Modern ikaite are mostly found in regions that experienced low temperatures, thus glendonites are considered to be an indicator of near-freezing temperatures in the past (e.g. Kaplan, 1978; Shearman and Smith, 1985; Last et al., 2013). Indeed, glendonites have been found in association with glaciomarine sediments (Johnston, 1995; James et al., 2005; Thomas et al., 2005; Spielhagen and Tripathi, 2009), and they have also been associated with upwelling of near-freezing waters onto relatively shallow shelves (Brandley and Krause, 1994; Jones et al., 2006, Mikhailova et al, 2019). Despite the general association with cold conditions, the relevance of glendonites as a paleotemperature indicator is still questioned (Shearman and Smith, 1985; Teichert and Luppold, 2013). To test the geographical distribution of glendonites through time, and attempt an understanding of the paleoenvironment that facilitated their occurrences we have compiled a global database of Phanerozoic glendonites (Rogov et al., 2021). This dataset has been reconstructed for key Mesozoic and Palaeozoic time intervals by using a global kinematic model. Our reconstructions indicate that most glendonites occurrences in Mesozoic and Palaeozoic times were originally formed in the polar or close to polar regions. The Cenozoic and especially recent glendonites formed close to polar seas (mainly Arctic wide shelves) or on deep-water continental margins (ex. Zaire deep fan, Nankai Trough, Sakhalin Island slope). The preservation potential of deep-water sediments in geological record are lower than epicontinental and marginal seas. Based on our global Phanerozoic reconstructions we suggest that documented glendonites found in Phanerozoic deposits could be used as a paleoclimatic indicators of cold-water environments.