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Temporal variability of the stability field of methane hydrates in the oceans

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Climate change is mainly monitored at the Earth's surface. However, it is well known that as part of ongoing climate change, ocean circulation is also changing, and therefore the ocean floor is also subject to temperature changes.
In this study, the depth of the global methane hydrate stability zone was assessed by analyzing its changes over the period from 1993 to 2018 to investigate the effect of climate change on the stability of methane hydrates.
Indeed, seafloor sediments are often permeated by a methane hydrate phase, the stability of which depends on the pressure and temperature field, among other parameters, and any changes in temperature conditions near the seafloor can bring the methane hydrate into unstable conditions.
The data needed for the assessment of methane hydrate stability were obtained from The Global Ocean Physics Reanalysis data set (GLORYS12V1), produced under the European Copernicus Marine Environment Monitoring Service (CMEMS), and GEBCO- The General Bathymetric Chart of the Oceans. The data were then processed with original data processing software developed in Fortran and Python languages.
A quantitative estimate of the amount of methane released into ocean masses by the dissociation of methane hydrate in shallow sediments over the period under consideration was also obtained. The release of large amounts of methane could have an impact on submarine geological hazards, such as submarine landslides, and the eventual reaching of the atmosphere by methane would reinforce ongoing climate change.