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End-Permian mass extinction caused by high volatile halogenated gases from giant salt lakes?

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Climatic and paleotoxicological processes, which caused mass extinction (ME) approx. 250 Ma ago may also play a decisive role in the present day sixth large-scale ME of species, caused by mankind. The speed with which the currently ME is taking effect is higher by a factor of 1000 than that of 100 years ago (8th UN Conference on Biological Diversity in 2006, Djoghlaf, 2006). The worldwide increasing temperature and dryness incorporated in climate change are already leading to progressive desertification and to an increase in number and surface areas of hyper saline salt lakes, salt lagoons, saline marshlands and sabkhas. Furthermore the predicted sea level rise by approx. 1 m (even up to 6 m according to more recent assumptions) leads to an expansion or new formation of salt ecosystems caused by flooding of coastal areas and hinterland. Particularly in regions with current and/or future semiarid and arid climatic features this will lead, amongst others, to increased emissions of naturally formed phytotoxic VHCs. Additionally, wind and storms will transport large quantities of salt (dust) from surfaces of these parched hyper saline salt ecosystems for uptake in so far unsalinated soils. An example of this is currently apparent in Central Asia, where several hundred thousand metric tons of salt dust are picked up every year from the former sea floor of the drying-up Aral Sea, the Kara-Bogaz-Gol and saline marshlands of Caspian Sea and transported several thousand kilometers [Orlovsky and Orlovsky, 2001]. In combination with increasing temperatures, intensive radiation and increasing input of man-made pollutants, desert areas of Central Asia are expanding ever faster. In this context it has to be borne in mind that today's observations only refer to a timeframe of a few years or decades. The developments at end-Permian, on the other hand, encompass approx. 100,000 years. In this respect, the current state of art does not permit any definite statements as to what extent present natural and man-made VHC emissions in combination with constantly increasing dry stress are able to provoke or favour a comparable ME process.