[JJ] Evening Poster | B (Biogeosciences) | B-CG Complex & General

[B-CG10]Phanerozoic biodiversity change: Extinction and diversification

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Biotic evolution was the consequence of repeated extinction and following diversification in the past, which was caused by large-scale environmental changes, in particular, by extremely rapid and drastic forcing that changed the environments of the biosphere. Irreversible and episodic changes in material cycling on the planet and in galactic cosmic radiation are nominated as major driving mechanism for the alleged rapid, large-scale environmental perturbations. The biodiversity change in the fossiliferous Phanerozoic record is characterized by 5 major mass extinctions within the long-term trend of diversity increase. Nonetheless, each extinction event has been explained rather in ad hoc manner, without any universal explanation. This session discusses the Phanerozoic biodiversity change under a new light of the recent progress in geology.

[BCG10-P01]Polycyclic Aromatic Hydrocarbons during the Recovery from the end-Permian Mass Extinction in the Norwegian Sea

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Keywords:Mass Extinction, Polycyclic Aromatic Hydrocarbons (PAHs), Permian-Triassic

Five mass extinction events are recorded in the geological past. Arguably the most catastrophic is the end-Permian Mass Extinction (EPE) that occurred ~252 million years ago. During this period major extinction occurred in the both the marine and terrestrial realms, with ~95% of marine life and ~70% of terrestrial vertebrates becoming extinct. Recovery of life is an important factor regarding mass extinction events, and due to the severity of the EPE it has been suggested that recovery took on the order of 10 million years. Biomarkers are molecular fossils of lipids that derive from the 3 domains of life. During mass extinction events they are able to provide insights into the changes of redox, environmental and ecological conditions. One such group of these biomarkers are the Polycyclic Aromatic Hydrocarbons (PAHs). PAHs are associated with hydrothermal activity, the incomplete combustion of fossil fuels and wood, and may be formed during sedimentary diagenesis and catagenesis. During the EPE, the appearance of PAHs associated with incomplete combustion are found in sections from Western Australia, Greenland, China, and Canada. Here, data is shown from the Panthalassa Ocean in the Northern Hemisphere during the recovery of the EPE showing an abundance of PAHs. These include benzo(*a)* pyrene, benzo*(e)*pyrene, coronene, fluoranthene and pyrene. The pattern of a uniform increase in each of these biomarkers indicates an emergence of wildfires during the EPE recovery phase. Perylene a fungal wood marker, is present in extremely low concentrations. Retene is one such PAH that can be produced by wood combustion, but has also been suggested as a source of phytoplankton in sediments from the geological past. As retene shows a similar pattern to other combustion elated PAHs it is likely tracking the combustion of wood and is thus an additional indicator of wildfire. Ratios of dibenzothiophene and phenanthrene are representative of the source rock lithology (values >1 are carbonates and values <1 are shales) and shows clear transition across the Permian-Triassic boundary.