Composition and origin of lipid biomarkers in the surface sediments from the southern Challenger Deep, Mariana Trench

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The surface sediments were collected from the southern Mariana Trench in water depths ranging between ca. 4900 and 7068 m in order to understand the origin of lipid biomarkers and the source of sedimentary organic matter. Among these samples, unresolved complex mixture (UCM) and resistant component tricyclic terpanes were detected whereas C_{27}-C_{29} regular steranes and hopanes indicative of crude oils were almost absent. This suggest that the organic matter was partially derived from degraded oils. The relative high concentrations of even predominant *n*-alkanes and low Carbon Preference Indices (from 0.29 to 0.45) indicated that the *n*-alkanes were mainly synthesized by diverse microorganisms inhabiting a petroleum contaminated environment, since the *n*-alkanes are the first removed compound class in biodegradation. Also detected were even-carbon numbered *n*-fatty acids $C_{12:0}$–$C_{22:0}$ with maximum at *n*-$C_{16:0}$ and *n*-alcohols $C_{12:0}$–$C_{22:0}$ with the *n*-$C_{18:0}$ accounting for 90% of the total *n*-alcohols. Characteristics of these biomarker patterns were attributed to a large input of algae and bacteria. The longer fatty acids and *n*-alkanes were more depleted in ^{13}C as a result of carbon chain elongation during lipid synthesis. In samples BC06, BC08, BC11-1 and BC13-1, GDGTs were mainly derived from marine Thaumarchaeota and may point to a significant input of methanogenic archaea in sample BC07.