# Toward the molecular based reconstruction of paleovegetation and palaeoenvironment by plant terpenoid biomarkers: maturity related biases

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Plant terpenoids serve as chemotaxonomic indicators for major groups of land plants. Hence, relative amount of specific plant terpenoids, such as the ratios of di- to triterpenoid, have been used to estimate past plant community and its variation through time (e.g. Nakamura et al., 2010). However, diagenetic processes significantly alter the terpenoid compositions (i.e. defunctionarization, isomerization and aromatization). This implies the use of simple and commonly used terpenoid ratios such as Higher Plant Parameter (retene/(retene + cadalene); van Aarssen et al., 2000) probably include maturity related bias, especially around the maturity where the adopted compounds are rapidly formed from rather intact moieties. In the present study, we analyzed the plant terpenoid compositions in the Cretaceous sediments from Hokkaido to examine the maturity related variations in the series of plant terpenoids.

Although some polar terpenoids were present in relatively immature Cenomanian–Turonian sequences in the Tomamae area, Hokkaido, most plant terpenoid derivatives were identified as defunctionalized hydrocarbons; aromatic sesqui-, di- and triterpenoids are predominant, associated with relatively minor amount of aliphatic moieties. We calculated enhanced indices (i.e. HPP'; including all moieties related to retene and cadalene adopted in HPP), and compared them against maturity indices. HPP tend to underestimate the diterpenoid contribution under lower maturity ($C_{31}$ hopane S/(S+R) <0.3). We also note that maturity independent variations (i.e. degree of aromatization (DOA)) may carry different paleoenvironmental information via different early diagenesis.

References:
van Aarssen et al., 2000, *Geochim. Cosmochim. Acta* 64, 1417–1424.
Nakamura et al., 2010, *Org. Geochem.* 41, 975–980.