

## Transport and diagenesis of higher plant terpenoids in soil, peat and lacustrine sediment from northern Hokkaido

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Marine and lacustrine sediments can be useful as geological samples from which long-time scale (more than several 100 thousands years) terrestrial environmental information is successively recorded. However, the terrigenous matter that had information of environment and ecosystem in provenance are transported from land area to ocean and lake, and deposited as allochthonous matter in marine and lacustrine sediments. During the transport and deposition processes, such matter must be chemically and morphologically altered, and also, the records for environment and ecosystem in provenance are possibly changed. Thus, it is important for reconstructing the terrestrial paleoenvironment and paleoecological aspects to examine the alteration or consistency for terrestrial records during those processes. In this study, we focus terrestrial higher plant biomarkers such as terpenoids, in which structures vary depending on taxonomical differences. We analyzed the terrestrial higher plant terpenoids (HPTs) in forest soils, peats, and lacustrine sediments from the Uryu forest area and the Lake Shumarinai-ko in northern Hokkaido, to evaluate transport and diagenetic processes of higher plant-derived organic materials, and to examine for spread of terrestrial environmental records from provenance to lake and ocean. Angiosperm HPTs such as betulin, betulinic acid, friedelin, oleanolic acid, and ursonic acid are abundantly identified in soil sample from broad-leaved tree-dominant forest area. In peat samples, where grass is dominant, relative abundances of oleanolic acid and ursonic acid are notably higher. On the other hand, gymnosperm HPTs such as dehydroabietic acid and abietic acid are abundant in soil from conifer-dominant forest area. These results indicate that the HPT records in forest soil directly reflect in situ vegetation. In addition, the detections of betulin and abietic acid, which are precursors of betulinic acid and dehydroabietic acid, respectively, in forest soils clearly show that organic matter in forest soils is more fresh. However, only friedelin and dehydroabietic acid could be identified as HPTs in river and lacustrine sediments in the lake Shumarinai-ko. This result suggests that the HPTs may be altered and lost partially by early diagenesis during transport and deposition processes in the sediments, resulting in only more refractory compounds have been preserved. From these results, we will discuss the more detailed implication for preservation of the records of the provenances such as forest and peat in river and lacustrine sediments.

**Keywords:** Higher plant terpenoid (HPT), paleovegetation, terrestrial environment, transport process, early diagenetic alteration, spread of environmental record