Impact of phenanthrene on the formation of microbial habitats in soil

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Recent studies reveal that there is a strong interplay between the physical soil structure and the activity of soil microorganisms [1, 2, 3]. Yet, a quantitative understanding of this feedback loop and their consequences for the soil functions remain speculative. Two-layer soil columns packed with soil material and spiked with phenanthrene in its upper layer will be used after forced-gradient transport experiment has been performed. Thin sections prepared from soil aggregates taken from different depths of the column will be analyzed to examine the impact of phenanthrene on the formation of microbial growth habitats in soil. Epifluorescent microscopy will be applied to identify growth habits of DAPI-stained cells of soil microorganisms and to determine their abundance and spatial distribution in the soil column. The microbial habitats will be examined by scanning electron microscope (SEM) and the results will be compared with the data obtained from non-spiked controls, where soil interfaces will be characterize to elucidate how the activity of phenanthrene degrading soil microorganisms alters the physicochemical soil properties. Such knowledge will contribute to a mechanistic understanding of the interactions between soil structure, habitat and microbial activity and may ultimately help to better understand soil formation and the functions of a soil.

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Alkenone record of the 19 years long time-series sediment trap samples collected at central subarctic North Pacific and Bering Sea

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The subarctic North Pacific including the Bering Sea is the area that efficient biological pump works [1]. According to the global compilation of sediment trap experiment [2], the subarctic North Pacific including the Bering Sea represents that biogenic opal/$CaCO_3$ ratios of settling particles is the highest in the world. The time-series observation of settling particles is valuable to understand the changes in the function of subarctic biological pump associated with climate changes. Thus, to understand characteristics of prymary fluxes of biogenic particles, plankton assemblages and to detect the environmental variation and changes in low trophic level ecosystem associated with current climate changes, settling particulate samples were collected for 19 years by sediment trap mooring system at St. SA (49°N, 174°W, water depth 5406m) in the central subarctic North Pacific and at St. AB (53°30'N, 177°W, water depth 3788m) in the central Bering Sea from 1990 to 2010 [3]. The diatom and radioralia having opal test were predominant components throughout the 19 years at both stations. The $CaCO_3$ was the secondly dominant component of settling particles [3]. The $CaCO_3$ was composed of calcareous nannoplanktons and micro zooplankton. *Coccolithus pelagicus* and *Eminiania huxleyi* were two major species. The relative abundance of *C. pelagicus* and *E. huxleyi* were average 55% and 42% to the total calcareous nannoplanktons [4]. Alkenone flux increased in August, September, October and November at both sites. In the presenation, more details about the alkenone flux will be shown. We will discuss the seasonal and annual changes in alkenone fluxes comparing with other components.

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