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Grain size variations and climatic fluctuation during last 130 ka in the marginal area of the Japan Sea

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1. Introduction

The sedimentation rate and the grain size of Aeolian dust in the marine sediment show glacial-interglacial scale variations and D-O cycles in the This tendency also can be seen in the central area of Japan Sea. Nevertheless the sediments of Japan Sea are contributed not only by Aeolian dust derived from the intercontinental arid area but also by the fluvial discharge and volcanic product derived from the marginal areas of Asia continent and the Japanese Arc. The marine cores of Japan Sea on MD179 were extracted mainly at the Umitaka spur at the Japanese arc margin, about 25 km northwest of Takada Plain. Thus it is supposed that these cores to be contributed by discharge from some rivers running throughout Takada Plain and Toyama Bay. Separating Aeolian dust and fluvial sediment from these cores, it is expected that the link between variations in aeolian sediments and fluvial sediments to be revealed.

2. Study Cores

MD10-3296, of which measured depth is 39.34m, were extracted at the depth of 914m on the Umitaka spur, and its sedimentation time is estimate to be about 90,000 years. MD10-3304, of which measured depth is 34.35m, were extracted at the depth of 896m on the Umitaka spur, and its sedimentation time is estimate to be about 130,000. These marine cores have silty or muddy sediments, and some tephra. Thus their sedimentation rate and age models have been established by tephrochronology (Nakamura et.al., 2013).

3. Study Method

The grain size of the raw and wet samples of these cores was analyzed by SALD3000S (Laser diffraction particle size analyzer). In the marine sediments, the biogenic matters, such as organic matters, foraminiferal shells and diatomaceous shells contain. In order to reveal the grain size fluctuation of terrigenous matters, the biogenic matters must be removed.

4. Result

The median grain size variation of the marine sediment has such trend that to be coarser in the relatively colder period and finer in the warmer period during from MIS 5 to 3. Compareing the median grain size fluctuation of the cores and oxygen isotope ratio cycle of SPECMAP and NGRIP, the grain size variation has the same trend with prior research before 30ka, but opposite trend after 30 ka. Removing biogenic matters from samples of each core, Aeolian dust and fluvial discharge will be divided from the marine sediment. In this presentation, the linkage between variation of fluvial discharge and geomorphic environmental change is discussed.

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Keywords: MD179, Umitaka Spur, grain size analysis, eolian dust