

Microplastics: diffusion into ocean floors and methodology for age determination

*Kiichiro Kawamura¹

1. Yamaguchi University

Plastic pollution in oceans is a significant social problem. It is current symbolic scenery that many plastic bottles are washed ashore at the Sea of Japan.

These plastic materials are ordinarily crushed to be microplastics that are disseminated into all the oceans. These microplastics adhered pollutants (e.g. PCB) are accumulated in marine creatures. Such plastic pollutions in oceans are investigated in shallow water depths, but it is unclear in deep-seas deeper than several thousands meters.

On the other hand, microplastics can use as an index fossil. Radionuclide is one of the famous examples for age determination using artifacts. For example, we use ^{134}Cs and ^{137}Cs for age determination. ^{134}Cs of about 2 years in a half life can be used an index of nuclear tests and nuclear power plant accidents. It plays an important role in the Fukushima Daiichi nuclear power plant accident (e.g. Oguri et al., 2013; Sci. Rep.). ^{137}Cs of about 30 years in a half life can detect the accident ages from sediments for relatively long time. The famous peaks of ^{137}Cs are nuclear tests in 1960s, the Chernobyl disaster in 1987 in sediments.

Microplastics are a similar artifact. According to the Vinyl Environmental Council, plastic products have increased rapidly from 100 million tons / yr in 1960s to 200 million tons / yr in 1991. But recently these have been 180 million tons / yr since 2008. These products and their particles as microplastics would accumulate continuously without any decaying, but it is unclear.

The aim to this study is 1) to know a spatial distribution of microplastics in surface sediments collected from deep-sea floor as several thousands meters in water depth, and 2) to know a vertical distribution of them. The first aim is to know a marine pollution degree of microplastics, and the second aim is to establish age determination using microplastics.

Keywords: Sediment age, microplastic, Surface sediments