



Radiocaesium activity concentration in surface water in the East China Sea, the Sea of Japan and western North Pacific since 1953 to 2018

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Long range transport of radiocaesium derived from local fallout occurred early 1950s, global fallout which occurred mainly late 1950s and early 1960s and the Fukushima accident occurred in 2011 were investigated and presented in ocean surface in the East China Sea, the Japan Sea and the western North Pacific Ocean since 1953 to 2018. HAM database and its update, HAM global 2018, were used in this study to present whole history of radiocaesium activity concentration in surface layer in the interested region. Both the main local/global fallout regions and injection of radiocaesium by Fukushima accident had occurred in the western North Pacific and constrain of surface current systems which governed surface transport processes were subtropical gyre and subarctic gyre. Radiocaesium transport in surface water in the mid latitude was characterized as rapid eastward transport along Kuroshio and Kuroshio Extension. The second largest controlling factor of radiocaesium activity concentration was subduction and obduction. Subduction occurs by winter cooling which forms Sub Tropical Mode Water and this is effective pathway of radiocaesium from surface to ocean interior, while obduction is a process by which radiocaesium back to surface from the ocean interior.

Radiocaesium activity concentration in surface water showed maximums in 2014/2015 in the northern East China Sea and in 2015/2016 in the Sea of Japan (Inomata et al., 2018, Ocean Science). A part of the radiocaesium derived from the Fukushima accident was transported within several years to the northern East China Sea and then to the Sea of Japan via Sub Tropical Mode Water from the western North Pacific and subduction/obduction processes made systematic delay of timing of maximum. After radiocaesium activity concentration in surface water reached maximum, it has been decreasing slowly until mid of 2018 in the Sea of Japan.

Both ^{134}Cs and ^{137}Cs were observed in the Sea of Japan and northern East China Sea while ^{134}Cs was not observed in the western and southern East China where Kuroshio enters from the western North Pacific to the East China Sea. This indicate that obduction of Fukushima derived radiocaesium from STMW might occur in the just south of Sub Tropical Mode Water formation region.