Rapid and High performance Cesium Absorption Technique

Utilization in quick Accident response for marine radioactivity monitoring

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In fast response to Fukushima Nuclear Power Plant Accident(Mar.11 2011),We developed a method for radioactive cesium measurement of sea water .Up to now We use the system to survey the $^{137}Cs/^{134}Cs$,in the west Pacific Ocean and the Chinese adjacent seas.

We have researched radioactive absorptive material for monitoring several times ,the study had sustained intermittently more than 30 years .This time we developed a filter element aimed for fast absorption of cesium in sea water.

1. About the cesium absorptive filtering element

The filter element is 60 mm in diameter,127 mm in length (Fig.1).

The filter element is quite effective for radioactive cesium absorption of sea water ,7 liters/min for filtering sea water, absorptive 98% of Cesium;

This data is quite astonishing to so many colleagues .We had entrusted the China Institute of Atomic Energy for absorptive effectiveness confirmation.

The filter element is effective in 4~35℃ of temperature range. The adsorption capacity of the element is 670mg of cesium.

Fig.1 The cesium absorption element

The γ -spectrum of the element after filtering thousand liters of sea water is quite clean, only $^{137}Cs/^{134}Cs$ ^{40}K prominent (Fig.2).

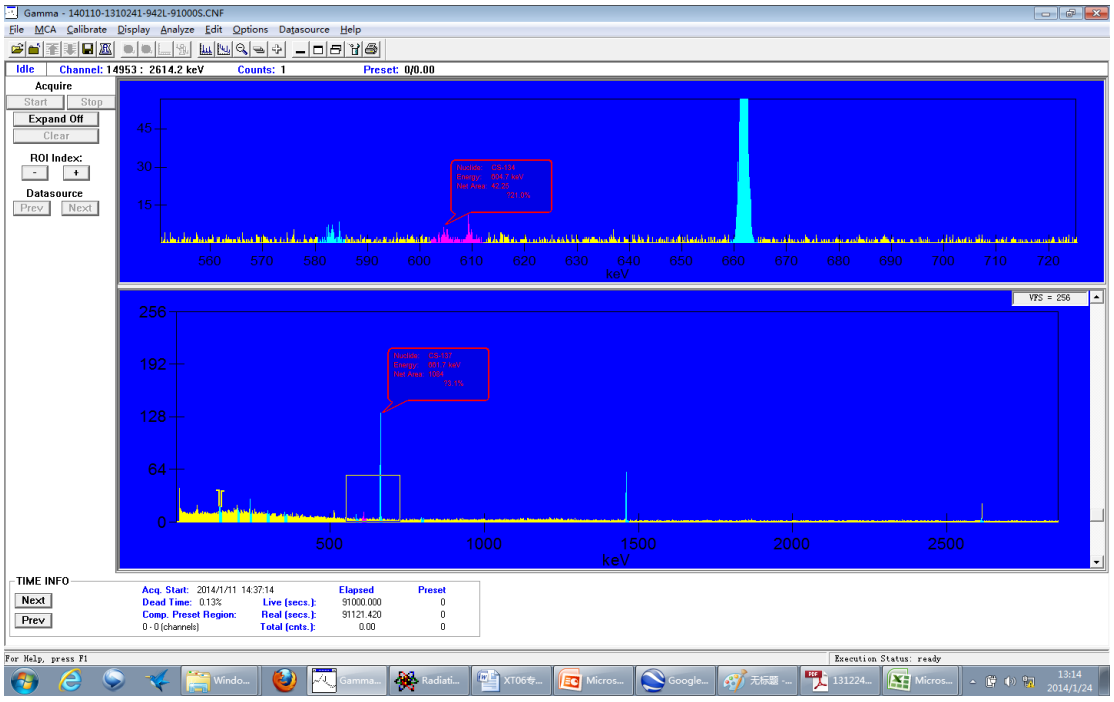

Fig.2 γ-spectrum of Filtering element after filtering thousand liters of sea water

In 2014, the cesium absorptive filtering element preparing method has owned the Chinese patency .

P.R. China Patent Priority

CN/01.08.13/CNA201310331819

European patent Office

EP/16.04.14/EPA 14164976

US and Japan patent application accepted

2 . Auto quick analyzer

We had developed an auto quick analyzer for monitoring $^{137}Cs/^{134}Cs$ of sea water. The analyzer is consisted of PLC, peristaltic pump, HMI etc.

Fig.3 Quick radioactive element analyzer

The analyzer automatically pumped sea water sample, the water sample is filtered , particulate materials are cleaned out; before the water entering cesium filtering element, the pH of the water is automatically regulated at certain pH point.

3.Utilization in west Pacific Ocean and Chinese adjacent seas

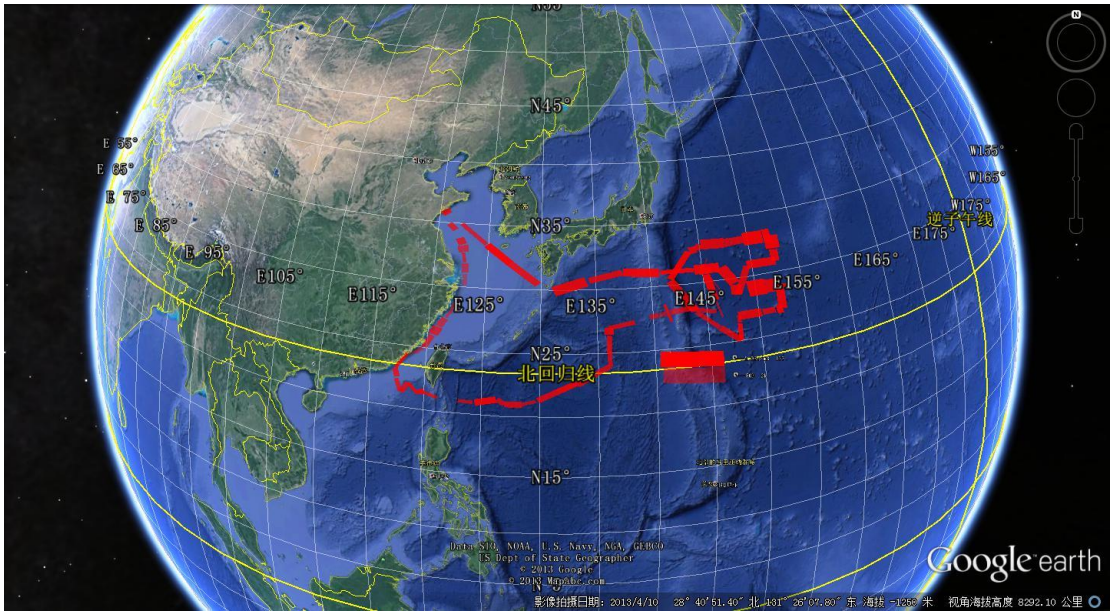

Fig.4 Marine ^{137}Cs monitoring May-June 2013

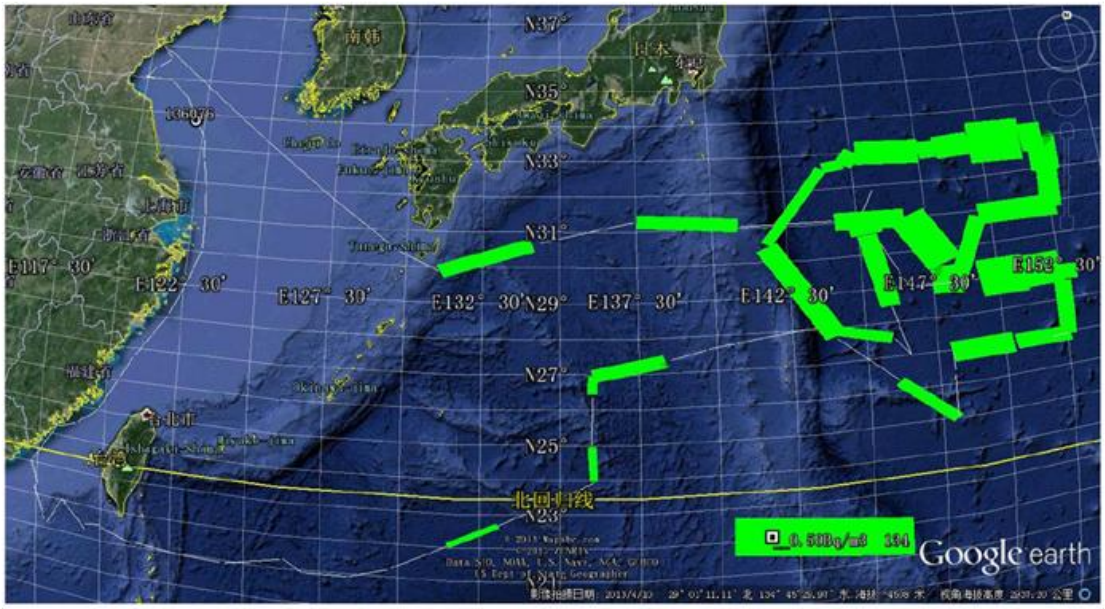

Fig.5 Marine ^{134}Cs monitoring May-June 2013

all in surface water along the course.

Only one analyzer, one staff, one HPGe, finished the whole cruise. Easy, Quick, precise, and pleasant.