MONITORING OF ENVIRONMENTAL RADIATION ON THE SPRATLY ISLETS IN THE SOUTH CHINA SEA

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The concentration of radionuclides in environmental samples and the environmental radiation level (including cosmic rays) was monitored on Spratly Islets in South China Sea prior to the commercial operation of nearby Chinese nuclear power plants. Samples of coral sand, sea food, vegetation, water, and accumulated fallout on the islet were obtained and measured for radioactivity. Except for some exposure originating from minute amounts of $^{60}$Co and $^{137}$Cs, the radiation background is mainly emitted from naturally occurring radionuclides. Radiation levels including beta, gamma, and neutron on the islet have also monitored. Gamma dose rates for outdoor exposure averaged approximately 0.09 μSv/h; the neutron dose rate was about 0.003 μSv/h. Automatic radiation surveillance and a routine sampling program on the Spratly Islets are viewed as essential to provide an early warning in the Far East in case of a nuclear emergency.

As more nuclear power plants are constructed and to come operational in the South China Sea basin, a region covering China, Taiwan, and the Southeast Asian countries, a preoperational comprehensive radiation survey must be setup within the South China Sea. The Spratly Islets group, consisting of more than 100 coral islets, sand cays, and shoals, lies in the center of the South China Sea. It is strategically located near the heavy sea traffic lines, halfway between Hong Kong and Singapore on a north-south route, and between Manila and Saigon on an east-west route, as illustrated in Fig. 1. It has been reported that the radioactive fallout from a possible nuclear accident at the Da-Ya Bay nuclear power station in southern China (newly commissioned on Feb. 1994) would first arrive over Spratly Islets before dispersing to neighboring countries. For a Chernobyl-type accident, the radiation dispersion during winter time from Day-Ya Bay may arrive at the Spratly Islets within a few days after the accident, taking several more days to reach the Southeast Asian countries further away. Thus, monitoring the environmental radioactivity on the Spratly Islets not only provides a timely warning to neighboring countries in case of a nuclear emergency, but also supplies a database for a further surveillance network.

In this study, environmental samples were obtained and analyzed, and the environmental radiation level was surveyed on the Itu Aba of Spratly Islets. The quantity of environmental radioactivity was assessed and possible origins are discussed. The results are compared to those in Taiwan. Future radiation surveillance with automatic equipment is recommended.

Environmental Survey

Early in 1994, a research team was dispatched from the National Tsing Hua University (NTHU) on Taiwan to the South China Sea to conduct environmental radiation surveys with portable equipment and to collect environmental samples, which were subsequently analyzed in the laboratory at NTHU.
Spratly Islets: The Itu Aba Islet, the largest coral island in the Spratly group (Nan-Sha Chun Dao in Chinese), is the outmost island under the administrative jurisdiction of the Republic of China (ROC) on Taiwan. The islet, also known as Taiping Dao in Chinese, has an area of 0.5 km² and is about 1360 m long and 350 m wide. It is located (10°23′N and 114°22′E) at the western entrance of the Spratly group and enclosed by an oval-shape coral reef of the Tizard Bank. The islet lies in the typhoon belt of the Western Pacific and is thus...