

# Research on the effects of ocean current on nuclear wastewater in Japan

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**Abstract.** According to reports, the Fukushima Daiichi Nuclear Power Station nuclear pollution water drainage project has been completed. Subsequently, Tokyo Electric Power will directly discharge nuclear wastewater into the ocean through a subsea tunnel connecting the land. These nuclear wastewater will be discharged to the waters near the Tropic of Cancer, which is greatly affected by the Japanese warm current, and nuclear wastewater will be taken around the world through ocean currents. German research institutions point out that within a month from the date of discharge of Fukushima nuclear wastewater, its radioactive material will spread to most of the Pacific Ocean, which will seriously affect global fish migration, ocean fisheries, human health and ecological security. Due to the impact of the global ocean current, China's East China Sea, the Yellow Sea and the Bohai Sea will also be affected by nuclear waste water pollution. Based on this, this text will start from the impact of the El Nino warm current on the flow of nuclear wastewater, and will soon explain the impact of Japan's dumping of nuclear wastewater on global security, and from a personal perspective on the current view of environmental protection and governance.

**Keywords:** Nuclear Wastewater, Environmental Impacts, Health Effect.

## 1. Introduction

In March 2011, an earthquake in Japan caused a tsunami of 14, and a nuclear leak occurred at the Fukushima nuclear power plant. In order to prevent the nuclear power plant reactor from overheating and exploding, Japan injects 150 tons of seawater into the reactor every day to cool it, and these seawater soaked in the reactor becomes "nuclear pollution water". The Fukushima coast has the strongest ocean current in the world. Within 57 days from the date of emission, radioactive material will spread to most of the Pacific Ocean. After 3 years, the United States and Canada will be affected first. After the warm current of the North Equator, nuclear wastewater will reach the Taiwan waters and further spread to the East China Sea. Fukushima is facing the Pacific Ocean, while the sea in the ocean is not still stopping. It will flow like a river, along the relatively fixed route, this is "a seafruit". If an ecological environmental pollution occurs at sea, the waters are the main factors affecting the transport of pollutants. Therefore, the radioactive substance in nuclear sewage will spread into the Pacific and the Global Ocean with the direction of the sevore.

After leakage of the Japanese Fukushima First Nuclear Power, various countries and institutions evaluated the radioactive substance emissions emission according to a large number of environmental

radioactive monitoring results, with a total of approximately 940 PBQ ( $^{131}\text{I}$  equivalents), 1/6 [1] of the total amount of radioactive substance released during the Soviet Chernobyl nuclear accident. The radioactive substance released by the Japanese Fukushima nuclear accident is mainly transmitted to the outside world through three types of marine flow, ocean internal water body and gas [2]. Among them, the release of the radionuclide released into the atmosphere mainly includes Xe, Kr, I, Cs, Zr and Nd, etc.; the radionuclide entering the ocean mainly includes  $^3\text{H}$ ,  $^{90}\text{Sr}$ ,  $^{14}\text{C}$ ,  $^{129}\text{I}$ ,  $^{131}\text{I}$ ,  $^{134}\text{Cs}$  and  $^{137}\text{Cs}$ , etc. 80% of the radioactive substances leaked by the Japanese Fukushima nuclear accident entry into the Pacific, 19% settlement in Japan, about 1% settle in North America and Eurasian continental area [3].

This paper would like to express the negative impact of Japan's dumping nuclear wastewater through the El Niño.

Epidemiology and clinical study show that low-dose radiation may cause cancer, cardiovascular and cerebrovascular disease [4] and cataract [5]. A queue study based on the census found that the low-dose radiation exposed to natural sources, enabling children leukemia, lymphoma, and central nervous system, the risk of leukemia is the risk ratio of leukemia 1.04, 95% CI (1.00, 1.08), the risk ratio of lymphoma is 1.01, 95% CI (0.96, 1.05), the risk ratio of the central nervous system is 1.04, 95% CI (1.00, 1.08) [6]. In addition, a retrospective queue study on radiation exposure and subsequent leukemia and brain tumor risk of CT scanning in children show that children with CT scans may be approximately 50 mSv children may make it. The risk of Chinese blood has increased by three times, while the dose is about 60 mSv, which may increase the risk of cerebral cancer by three times [4, 7].

## **2. Characteristics of ocean current and the marine hazards it triggers**

### *2.1. Ocean current*

The causes of the seafront are more complicated. The main factors that drive the upper seawater movement are the wind stress of the sea surface, so the exercise of the upper seawater is also known as "wind circulation", such as everyone's well-known Pacific Black tide and the Atlantic Mexico Bay. It is an important part of the wind circulation. The main factors affecting the stress of the sea surface include solar radiation, global rotation, and the like. The solar radiation energy from the surface of the earth is uneven, which produces the wind. Taking into account the role of the earth, the mid-latitude area of the north-south hemisphere is a west wind strip, and the tropical and polar region is Dongfeng belt. In fact, whether the atmosphere is still the ocean, the source of sports energy is from solar radiation.

The sea flow near Fukushima has the main black tide and a pro. The black tide is a warm flow along the Western Border of the Pacific from the low latitude area, and the trend is a cold flow along the wear circles from the wear. The two are consistent between 35 degrees -40 degrees in the north latitude, then pass through the Pacific Ocean to the west coast of the Americas. Although it will not flow in China, South Korea is coastal, but there is a large vortex rotating clockwise in the entire side tropical Pacific region, and the pollutant reaches the west coast, and the side tropical vortex West Flow, will still arrive in Japan west, which can be said that the entire Pacific will be affected. After a longer time scale, these pollutants will eventually enter the Indian Ocean and the Atlantic. Due to a variety of radioactive elements, nuclear sewage on the ocean system also requires long-term monitoring and tracking research. For example, the half-life of T is 12.43 years, the degradation time of the elements such as carbon 14, cobalt 60 and ruthenium 90 is longer, at least a large impact on this regional fishery resource and ecological environment.

The impact of marine circulation is obvious to humans. Every year, the typhoon we have to experience will appear on the warmers; the El Niño phenomenon that occurs in a few years is due to uncommon El Niño warmth caused seawater. The temperature rise, leads to global climate change; new fairy wood events occurred around 10,000 years ago, the climate has dropped for thousands of years, and a large number of species (including some ancient humans) are extinct. At present, scientists also think one. The important reason is that the ocean circulation has changed. On the other hand, the pollutants discharged by human activity can have a huge impact on the global environment through the seaflifer (in larger spatial scale, referred to as marine circulation). For example, the microcapns that are

increasingly focused recently, as the ocean circle floats until the four-sided eight parties, even enters the animal, and ultimately affect the health of humanity through the edible sea products. For example, in 1978, a 4.46,000 ton of crude oil was disclosed in a French coast, and the oil film with a 19 km of oil was blown to the Northwest Wind to the French coast, polluted about 320 kilometers of coastline, for local ecology. The environment has an irreversible harm.

*2.1.1. The El Nino phenomenon.* It is an abnormal natural phenomenon in the Pacific Ocean, and its distinctive feature is that the sea water in the eastern and central waters of the equatorial Pacific Ocean has increased significantly. On the west coast of South America and the eastern part of the South Pacific, a famous Peru cold current flows from south to north. From November to March each year is the summer of the southern hemisphere. The water temperature in the southern hemisphere generally rises, and the equatorial warm current flowing westward is strengthened. Just at this time, the global pressure zone and wind zone moved south, and the northeast trade wind crossed the equator and was subjected to the self-bias force (also known as the ground-to-biased force) in the southern hemisphere, and deflected to the left to the northwest monsoon. The northwest monsoon not only weakened the offshore wind on the west coast of Peru, the southeast trade wind, which weakened or even disappeared cold water in Peru, but also blew the warm current of the equator to the south, causing the cold water temperature in Peru to rise abnormally. This quiet, non-fixed ocean current is called the "El Nino warm current". The emergence of El Nino will inevitably cause regional or global climate anomalies. In the context of global warming, the intensity of extreme weather and climate events has been strengthened, the duration is longer, and the impact is more significant. The World Meteorological Organization believes that under the influence of El Nino, 2024 will likely become the hottest year on record. Along with the continuous discharge of the 30-year cycle of Fukushima nuclear wastewater, comprehensive consideration of the extreme high temperature and super precipitation brought by strong El Nino in recent years will lead to more serious large-scale death of marine life, even the marine harm that cannot be estimated. At present, radioactive substances caused by multiple nuclear power plant accidents are deposited in the world of glasses, but with the warming of climate, the global glasses have gradually melted. By then, these radioactive substances may become a timing bomb that pollutes the environment, and the concentration of these nuclear radiation is 10 times higher than other places. The radioactive substance caused by nuclear power plant accidents is deposited in the world's glasses, and these radioactive substances may become a timing bomb in the environment with rising fever sediments in temperature.

## *2.2. Nuclear waste water harm to the environment and human body*

Firstly, pollution to the global waters. After the nuclear waste is discharged, the Japanese Pacific coastal waters will be the first to rush, especially the local waters around Fukushima Prefecture, and the sewage will also pollute the East China Sea. Japanese scholars pointed out that nuclear sewage discharged into the ocean will affect global fish migration, ocean fisheries, human health, and ecological security. It is therefore more than just Japanese domestic issues, but involves international issues related to global marine ecology and environmental safety. Secondly, irreversible damage to genes may cause. Green peace organization nuclear experts pointed out that carbon 14 contained in the daily nuclear wastewater is dangerous within thousands of years and may cause gene damage. The United States "Science" magazine has previously written, in addition to the current T element, nuclear sewage also contains a variety of radioactive substances, need to be highly concerned about the potential to release sewage to the ocean danger. Thirdly, the pollution of the delivery of the food chain has experimental proves, if long-term, a large amount of eating radioactive contaminated sea products may make the in vivo accumulation exceed the allowable amount, causing a disease such as chronic ray disease. Hematathy organ, endocrine system, nervous system, etc.

Furthermore, emission nuclear waste water is seriously harmful to the ocean. Nuclear waste water contains high concentration radioactive substances such as uranium, plutonium, etc., which have powerful radioactivity and toxicity. Once the ocean is disconnected, these substances will be spread and absorbed by seawater, causing damage to marine ecosystems and biodiversity. Radioactive materials

will accumulate in marine organisms, which in turn affect the entire food chain, and even pass to human body, and the human health constitutes pillars in threats. In addition, nuclear wastewater discharge may also trigger marine pollution, destroy the marine environment, affect fisheries resources and economic development. Therefore, nuclear wastewater discharge should be strictly limited, take effective treatment methods, protect marine ecosystems and human health. Nuclear wastewater emissions are mainly reflected in: powerful radioactivity and toxicity damage to marine life brothers and food chains. The accumulation of radioactive substances may be transmitted to human body, and there is a potential threat to health. It may trigger marine pollution, destroy the marine environment, affect fisheries resources and economic development.

### 3. Conclusion

Based on study, the following aspects need to be considered for nuclear sewage: First, nuclear sewage should receive the attention and pressure of global society. The Japanese government should be supervised and stressed by international organizations and countries to promote proper treatment of nuclear sewage. At the same time, countries should strengthen cooperation and exchanges to meet global environmental issues. Second, the Japanese government should strengthen public education and publicity, let the public understand the seriousness of nuclear sewage, and actively explain and introduce the measures and effects taken by the Government. At the same time, we should pay attention to public opinions and feedback, and actively respond to and solve the public concerns and worry. Third, the Japanese government should consider the influence of nuclear sewage on local residents and the environment and take appropriate measures to protect their health and safety. For example, appropriate medical security and environmental monitoring can be provided, and rigorous control and management of nuclear sewage discharge. In summary, I think nuclear sewage problems need to be concerned with the attention and stress of global society. The Japanese government should take more safe, reliable and transparent way to deal with nuclear sewage problems, and strengthen public education and publicity, considering nuclear The effects of sewage on local residents and environments. Only by these measures can only protect human health and environmental safety, avoiding nuclear sewage on a far-reaching impact on global marine ecology and human society.

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