

Fukushima radioactive water and tsunami debris spread in the Pacific Ocean

Thursday 24 November 2011, by [KOTSUBO Yu](#), [Kyodo News](#), [SUGIMOTO Takashi](#) (Date first published: 22 November 2011).

Contents

- [Study: Radioactive water \(...\)](#)
- [Half of radioactive materials](#)
- [Scientists warn Japan tsunami](#)
- [Study: Vertical water force](#)

Study: Radioactive water reaches international date line

Radioactive water from the damaged Fukushima No. 1 nuclear power plant has reached the international date line, about 4,000 kilometers east of Japan in the Pacific Ocean, according to estimates.

The concentration of radioactive cesium-137 will be 0.1-0.01 becquerel per liter by the end of November, 10 to 100 times higher than before the accident started, according to estimates by the Japan Agency for Marine-Earth Science and Technology.

The concentration will be at one-2,000th to one-20,000th of the government safety standard for potable water, but monitoring will be necessary for any impact on fish and shellfish.

A team of researchers led by Yukio Masumoto estimated the flow based on radiation levels measured in waters around the Fukushima No. 1 plant, taking convection and other factors into account.

Radioactive water that leaked from the plant first moved along the coast and then gradually moved offshore.

The researchers estimated that it reached the international date line in four to five months after spreading amid complex flows between the Oyashio and Kuroshio currents.

The dispersion will not change much even on the assumption that airborne radioactive materials have fallen to the ocean.

A science ministry survey has found radiation levels of several becquerels in waters around the Fukushima No. 1 plant.

TAKASHI SUGIMOTO, *Asahi Shimbun* Staff Writer, November 22, 2011
<http://ajw.asahi.com/article/0311disaster/fukushima/AJ201111220048>

Half of radioactive materials from Fukushima fell into sea: study

TOKYO (Kyodo) — More than half of the radioactive materials that were emitted into the atmosphere in the days after the Fukushima nuclear disaster have since fallen into the ocean, according to a recent simulation by a team of researchers.

Between 70 and 80 percent of the radioactive cesium from the Fukushima Daiichi power plant in Fukushima Prefecture had fallen into the sea by April, with the rest having fallen on land, according to the simulation done by the Meteorological Research Institute in Tsukuba, Ibaraki Prefecture, and other researchers.

“The Fukushima nuclear power plant is located on the eastern edge of Japan, so only small amounts ended up falling on land because (such materials) get carried by the westerlies between March and April,” said Yasumichi Tanaka, a senior researcher at the Japan Meteorological Agency institute and a member of the research team. However, it suggests the fallout that did not make landfall polluted the ocean, he added.

A simulation model applied in the study was developed by the institute and the agency, and was used to see how such radioactive isotopes as cesium-131, cesium-134 and cesium-137 got dispersed in the days after the disaster triggered by the March 11 earthquake and tsunami.

Once released into the atmosphere, the materials were dispersed mostly northbound and reached the western coast of the mainland United States around March 17 after passing through eastern Russia and Alaska, according to the simulation. They are likely to have largely completed a round-the Earth trip around March 24.

Most of the radioactive materials fell with rain as they got carried through the atmosphere, the study showed, saying that about 65 percent of the cesium-131 released into the air in the disaster has since fallen into the sea.

The results of the study will be presented to an academic meeting in Nagoya that began Wednesday.

Kyodo Press, November 17, 2011

<http://mdn.mainichi.jp/mdnnews/national/archive/news/2011/11/17/20111117p2g00m0dm012000c.html>

Scientists warn Japan tsunami debris endangering Hawaii

LOS ANGELES (Kyodo) — Hawaii’s environment could be in danger as debris from Japan’s earthquake and tsunami in March, including lumber and home appliances adrift in the Pacific, has been approaching, researchers said at a meeting in Honolulu on Monday.

"The larger the piece, the more dangerous the piece," said Nikolai Maximenko of the International Pacific Research Center at the meeting on mitigating the impact of the debris on coastlines.

Large debris could damage reefs and shore-side facilities, while small debris could pollute beaches and injure endangered species such as the Hawaiian monk seal, said speakers from the National Oceanic and Atmospheric Administration and marine cleanup groups.

Maximenko showed a hypothetical plan to set up floating barriers near the Midway Islands, between Japan and Hawaii, and the northwestern coast of the U.S. mainland and actively collect the debris on a path toward land.

"No plan is ideal. But if you don't have a plan, you cannot do anything," Maximenko said, warning that only immediate action could intercept the debris before it starts landing on Midway.

It would be the best place to intercept debris, said Maximenko, because projections show that after passing Midway, the debris will head toward the Papahānaumokuākea Marine National Monument, more than 350,000 square kilometers of protected reefs and waters listed as a UNESCO World Heritage site last year.

But other participants said immediate work will be difficult due to rough sailing conditions caused by winter storms as the debris is then expected to start landing on the main Hawaiian Islands next March.

Kyodo Press, November 16, 2011

<http://mdn.mainichi.jp/mdnnews/national/archive/news/2011/11/16/20111116p2g00m0dm027000c.html>

Study: Vertical water force from tsunami destroys bridges

Some of the bridges swept away by tsunami during the Great East Japan Earthquake had been pushed up by powerful flows—as opposed to being moved horizontally—before being wholly carried away, a university study found.

The new findings highlight the need to investigate the water force imposed vertically on bridges, which has not been fully scrutinized, according to a team conducting the research.

The team, led by Kazuhiko Kawashima, professor of civil engineering at the Tokyo Institute of Technology, examined the ruins of the tsunami-devastated Utatsu-ohashi bridge on Route 45 in Minami-Sanriku, Miyagi Prefecture.

"Because earthquake-resistant standards for bridges have been set uniformly nationwide, similar damage could be caused to other bridges in different areas if another huge tsunami strikes," Kawashima said. "Bridges need to be reinforced against the 'push-up' force of water."

The group particularly looked at large steel fittings designed to prevent the bridge girders detaching from the bridge columns vertically when an earthquake hits, as well as blocks intended to restrict horizontal movement between the two bridge components.

As a result, no destruction or deformation caused to the fittings by the water force horizontally loaded on the bridge has been found. Such destruction or deformation are typically detected in the wreckage of a bridge when the bridge is pushed sideways by a tsunami. The blocks on the upstream side, however, were damaged instead.

YU KOTSUBO, *Asahi Shimbun* Staff Writer, November 17, 2011

http://ajw.asahi.com/article/0311disaster/quake_tsunami/AJ201111170075
