報道発表

文部科学省 MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY-JAPAN

February 24, 2012

Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas

The results of the airborne monitoring survey in restricted areas and deliberate evacuation areas (announced on February 3, 2012) were summarized today, so they are provided here.

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Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas

February 24, 2012

Team in Charge of Assisting the Lives of Victims around
the Nuclear Power Plant of the Cabinet Office
Nuclear Emergency Response Headquarters of MEXT
Ministry of Land, Infrastructure, Transport and Tourism

1. Objective of this monitoring

In order to ascertain changes in influences of radioactive substances due to natural phenomena such as the rainy season and typhoons, the Emergency Operation Center (EOC) of MEXT conducted the fourth airborne monitoring in the areas within 80km from TEPCO's Fukushima Dai-ichi NPP, where it conducted the third airborne monitoring, and confirmed the air dose rates and the deposition of radioactive cesium within the 80km-range from the NPP as of November 5, 2011 (already publicized on December 16, 2011).

In the meantime, past findings have verified that the deposition of radioactive substances varies depending on rainfall and other natural environmental factors.

Therefore, in order to ascertain the current situation in areas under evacuation order with the aim of reviewing the designation thereof in the future, the Team in Charge of Assisting the Lives of Victims around the Nuclear Power Plant of the Cabinet Office and MEXT's EOC decided to conduct airborne monitoring to measure air dose rates at a height of 1m above the ground surface, as well as to grasp the deposition of radioactive cesium on the ground surface.

It was also decided that in this monitoring, MEXT's EOC and the Ministry of Land, Infrastructure, Transport and Tourism would measure air dose rates in the air above the restricted areas and deliberate evacuation areas including the 20km-range from the Fukushima Dai-ichi NPP, for the purpose of ascertaining air dose rates in the air above said 20km-range.

This monitoring was conducted by the staff of the Nuclear Safety Technology Center, while installing measuring equipment for ascertaining radiation influences from the ground, which has been borrowed from the U.S. Department of Energy, and equipment for measuring air dose rates in the air using a private helicopter. The analysis of the measurement results was conducted by the Nuclear Safety Technology Center, and the Japan Atomic Energy Agency.

*Airborne monitoring is a technique in which highly sensitive, large radiation detectors are installed in an aircraft, and gamma rays from radioactive substances accumulated in the ground are quickly measured over a large area, in order to check the surface deposition.

2. Details of this monitoring

○Monitoring dates: February 6 to February 10

○Aircraft: A private helicopter (BELL430)

○Items covered: (i) Air dose rates 1m above the ground surface and deposition of radioactive cesium on the ground surface, in restricted areas and deliberated evacuation areas

(ii) Air dose rates in the air at around 300m from the ground above the restricted areas and deliberated evacuation areas

3. Results of this monitoring

3.1 Measurement results of air dose rates at a height of 1m above the ground surface, and accumulation of radioactive cesium on the ground surface

Attachments 1 to 4 contain the “Distribution Map of Air Dose Rate” which shows the air dose rate 1m from the ground surface, and the “Concentration Map of Radioactive Cesium in Soil” which shows the deposition of radioactive Cesium on the soil surface, both prepared through this monitoring.

The maps were prepared based on the following conditions.

○ Created based on the measurement results through the airborne monitoring conducted in the restricted areas and deliberate evacuation areas.

○ This published data was prepared based on the results obtained from February 6 to February 10 by one helicopter, in a total 7 flights.

○ Their flight altitudes were from about 300m above ground, and the air dose rate at the ground surface is the averaged value of air dose rates in a roughly about 600m diameter circle (varies by flight altitude) below the aircraft.

○ The width of the track is around 1.8km.

○ Regarding air dose rates, we established one test line within the target area of this monitoring survey, and

- first ascertaining trends at each altitude in counting rates (cps) measured in the air on the test line (150 to 900m) (altitude correction function), and then
- based on the counting rate at a certain altitude above the test line and air dose rates (μSv/h) at a height of 1m above the ground measured around the test line using NaI scintillators, obtaining the conversion factor between counting rates and air dose rates at a height of 1m above the ground (cps/(μSv/h)).

Air dose rates 1m above the ground were calculated by converting counting rates measured in the air above each monitoring point, using said altitude correction function and the conversion factor. We prepared maps of air dose rates by predicting (interpolating) air dose rates at points not on the flight route, based on the available measurement results of air dose rates (μSv/h).

○ Deposition of radioactive cesium were calculated by subtracting the average air dose rates due to natural radionuclides throughout all of East Japan from the values measured at respective

airborne monitoring points, and were based on the correlation between air dose rates and the results of the in-situ measurement using germanium semiconductor detectors, which was conducted by the Japan Chemical Analysis Center in the course of the project, the 2011 Strategic Funds for the Promotion of Science and Technology, entitled “Establishment of the Base for Taking Measures for Environmental Impact of Radioactive Substances — Study on Distribution of Radioactive Substances.” Based on the measurement results of the deposition of radioactive cesium (Bq/m^2), values at points not on the flight route were estimated (interpolated) to prepare soil concentration maps.

○ In the maps, the decay-compensated values as of the final day of the monitoring (February 10) were used.

○ Decay-compensated air dose rates were obtained by subtracting the average air dose rates due to natural radionuclides throughout all of East Japan from the measured values and then considering physical attenuation of Cs-134 and Cs-137 from the measurement time up to a certain point in time.

Regarding deposition amounts of Cs-134 and Cs-137, physical attenuation from the measurement time up to a certain point in time was taken into account.

○ There was snow coverage in some part of the targeted areas of this monitoring. Past monitoring results by MEXT have shown that air dose rates are apt to be lower at points covered by snow, with gamma rays being shielded, and the same tendency is expected to be observed. Therefore, in order to distinguish areas covered by snow (where the measurement results of air dose rates are supposed to show a lower deposition of radioactive cesium), such areas are indicated in white demarcated with solid lines on the maps. When identifying areas covered by snow, we used data obtained by NASA’s earth observation satellites, Terra and Aqua,[*1] which are available on the JASMES[*2] released by the Japan Aerospace Exploration Agency.

*1: We used the data of snow coverage around Japan, which were observed by the Moderate Resolution Imaging Spectroradiometer (MODIS) installed on NASA’s earth observation satellites, Terra and Aqua, and were analyzed by the Japan Aerospace Exploration Agency (JAXA) using its original processing algorithm. JAXA has been planning the Global Change Observation Mission (GCOM) to observe the Earth’s environment as a whole, including the atmosphere, ocean, land, snow and ice, from space on a long-term basis (10 to 15 years), thereby monitoring hydrologic circulation and climate change and figuring out the mechanisms thereof. Said data have been collected and processed for the purpose of assessing the analytical algorithm for optical sensors used in the Global Change Observation Satellite (GCOM-C). As they are 500m-grid data, snow coverage over 5cm with an even surface can be indicated correctly, but it is sometimes difficult to accurately identify snow coverage of a shallower depth or with an uneven surface.

*2: JAXA Satellite Monitoring for Environmental Studies

3.2 Measurement results of air dose rates at a height of around 300m above the ground

Attachment 5 is a map prepared based on the measurement results of air dose rates at a height of around 300m above the ground obtained through this monitoring.

The map was prepared based on the following conditions.

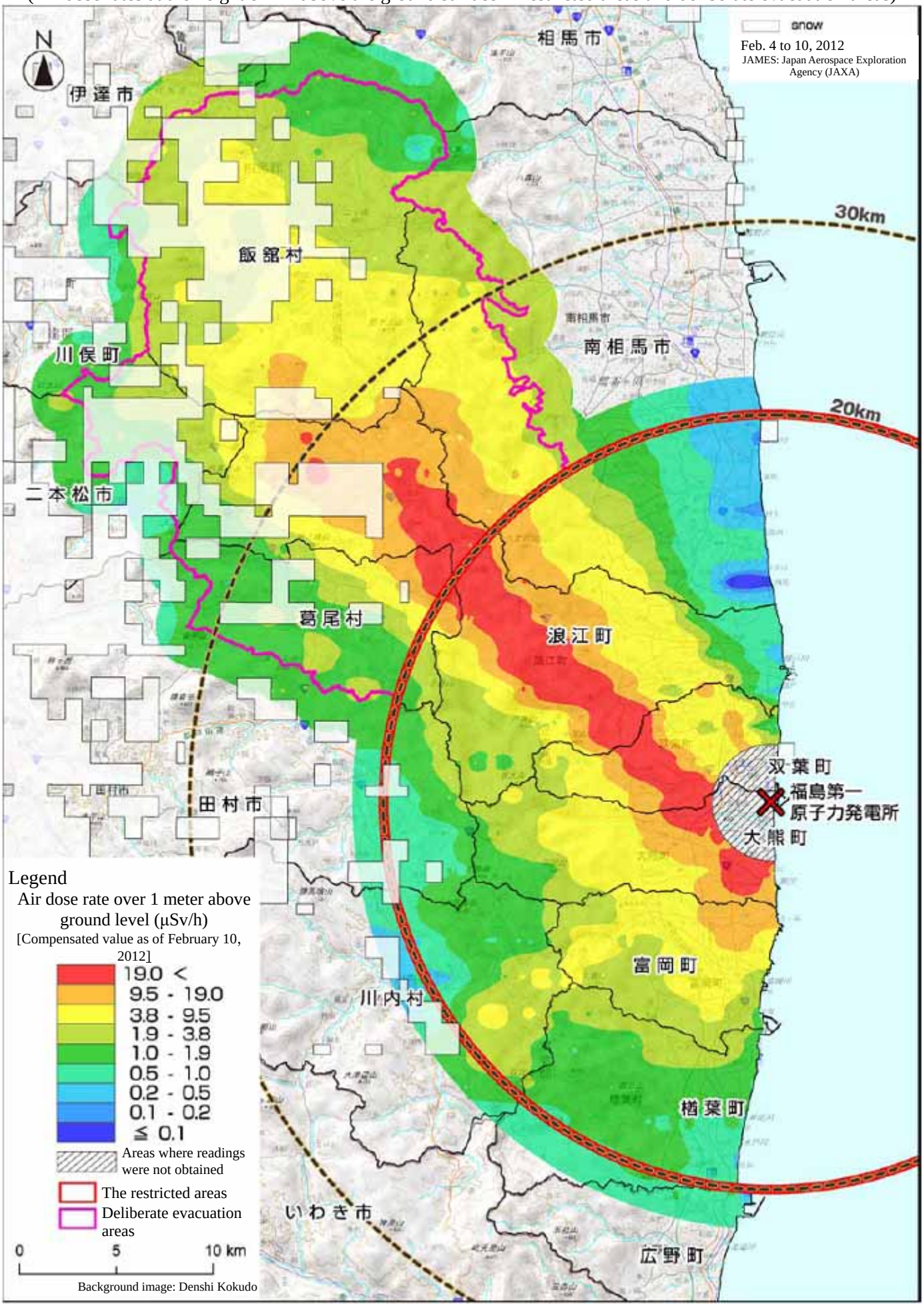
- ○ Created based on the measurement results through the airborne monitoring, which was conducted using equipment for measuring air dose rates in the air installed in a helicopter, for the purpose of measuring the air dose rates at a height of 1m above the ground surface and the deposition of radioactive cesium on the ground surface in the restricted areas and planned evacuation areas.
- ○ This published data was prepared based on the results obtained from February 6 to February 10 by one helicopter, in a total 7 flights.
- ○ The width of the track is around 1.8km.
- ○ The distribution map of air dose rates (Attachment 5) was prepared by directly using the values of air dose rates measured in the helicopter at a height of around 300m above the ground.
- ○ Air dose rates measured at a height of around 300m above the ground are mainly due to gamma rays from the ground, but in the air above areas covered by snow, the air dose rates may have become lower as gamma rays are shielded by snow coverage. Accordingly, as in the case of Attachments 1 to 4, areas covered by snow are indicated in white demarcated with solid lines on the map.

We measured air dose rates at several different heights on a test line that we established in Fukushima prefecture. As a result, as shown in Attachment 6, it was confirmed that the air dose rates measured at a height of around 150m (around 500 feet (152m) above the ground), which is the minimum safety altitude defined by the Civil Aeronautics Act, are nearly four times larger than those measured at a height of 1,000 feet (305m) above the ground.

A ttachment 1

Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas

(Air dose rates at the height of 1m above the ground surface in restricted areas and deliberate evacuation areas)

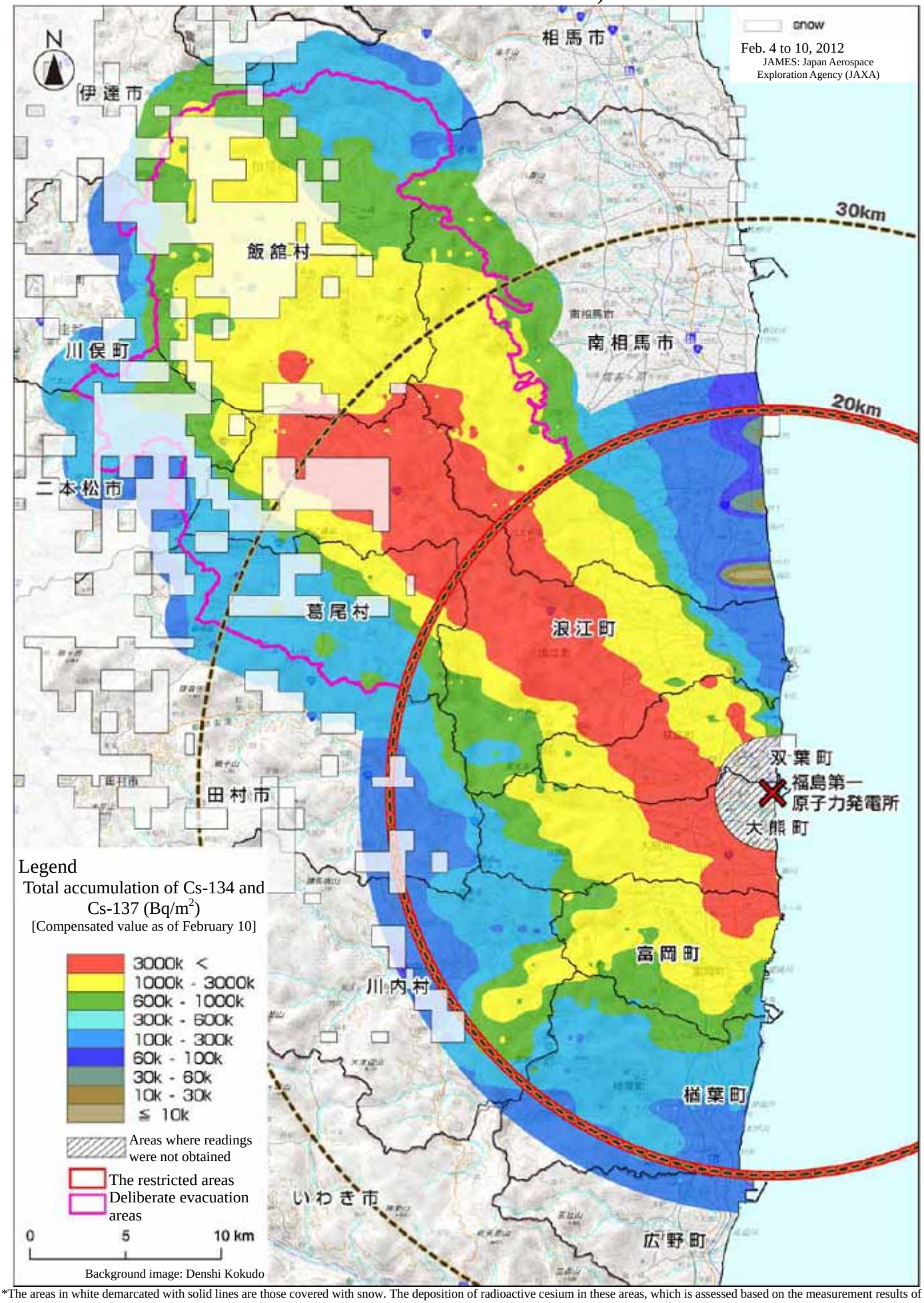


* This map contains air dose rates by natural radionuclides.

*The areas in white demarcated with solid lines are those covered with snow. The air dose rates at a height of 1m above the ground in these areas may have been reduced due to snow coverage compared to the time when there was no snowfall.。

A ttachment 2

Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas (Total accumulation of Cs-134 and Cs-137 on the ground surface in restricted areas and deliberate evacuation areas)

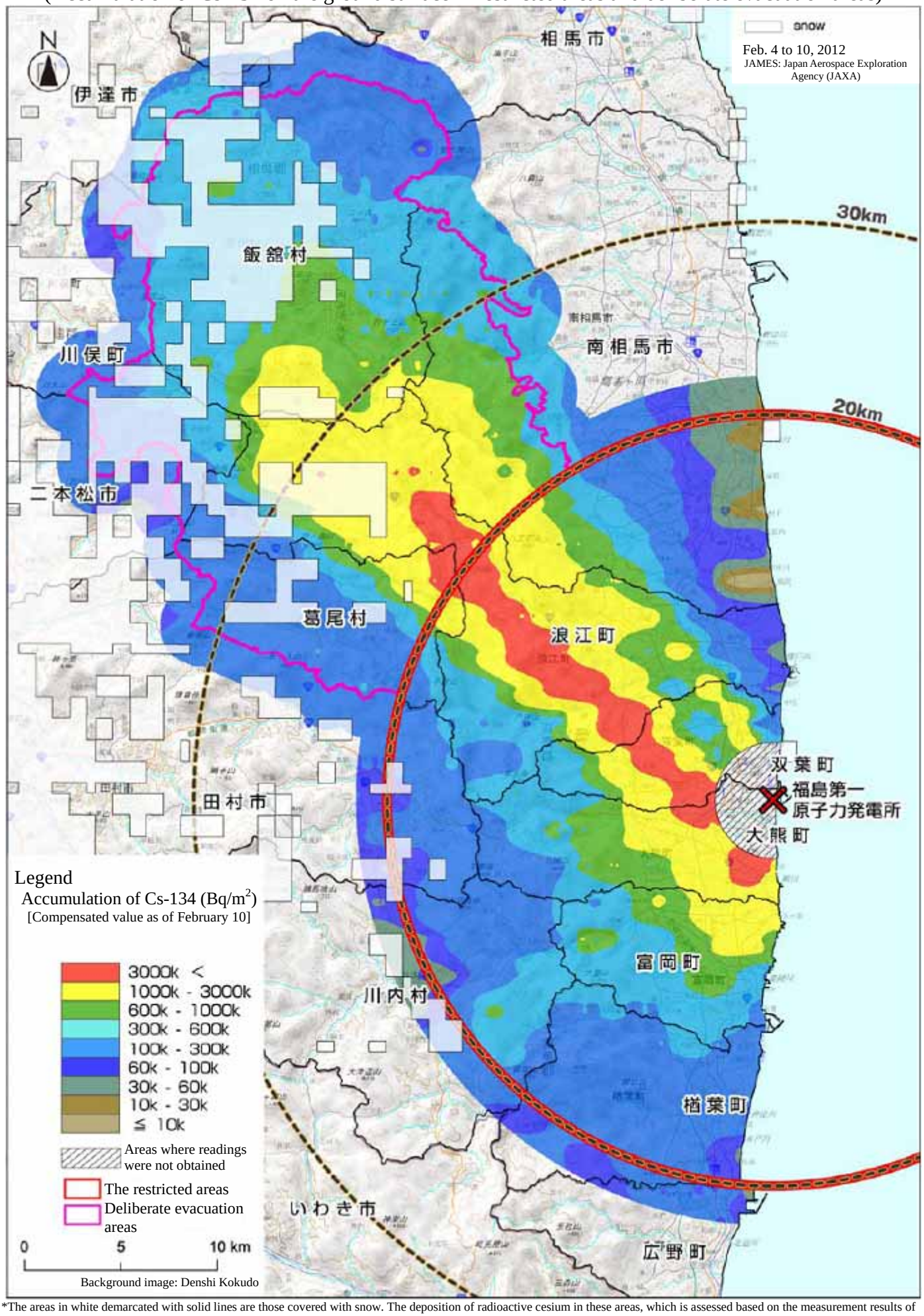


*The areas in white demarcated with solid lines are those covered with snow. The deposition of radioactive cesium in these areas, which is assessed based on the measurement results of air dose rates that have been reduced due to snow coverage, may be reduc。

A ttachment 3

Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas

(Accumulation of Cs-134 on the ground surface in restricted areas and deliberate evacuation areas)

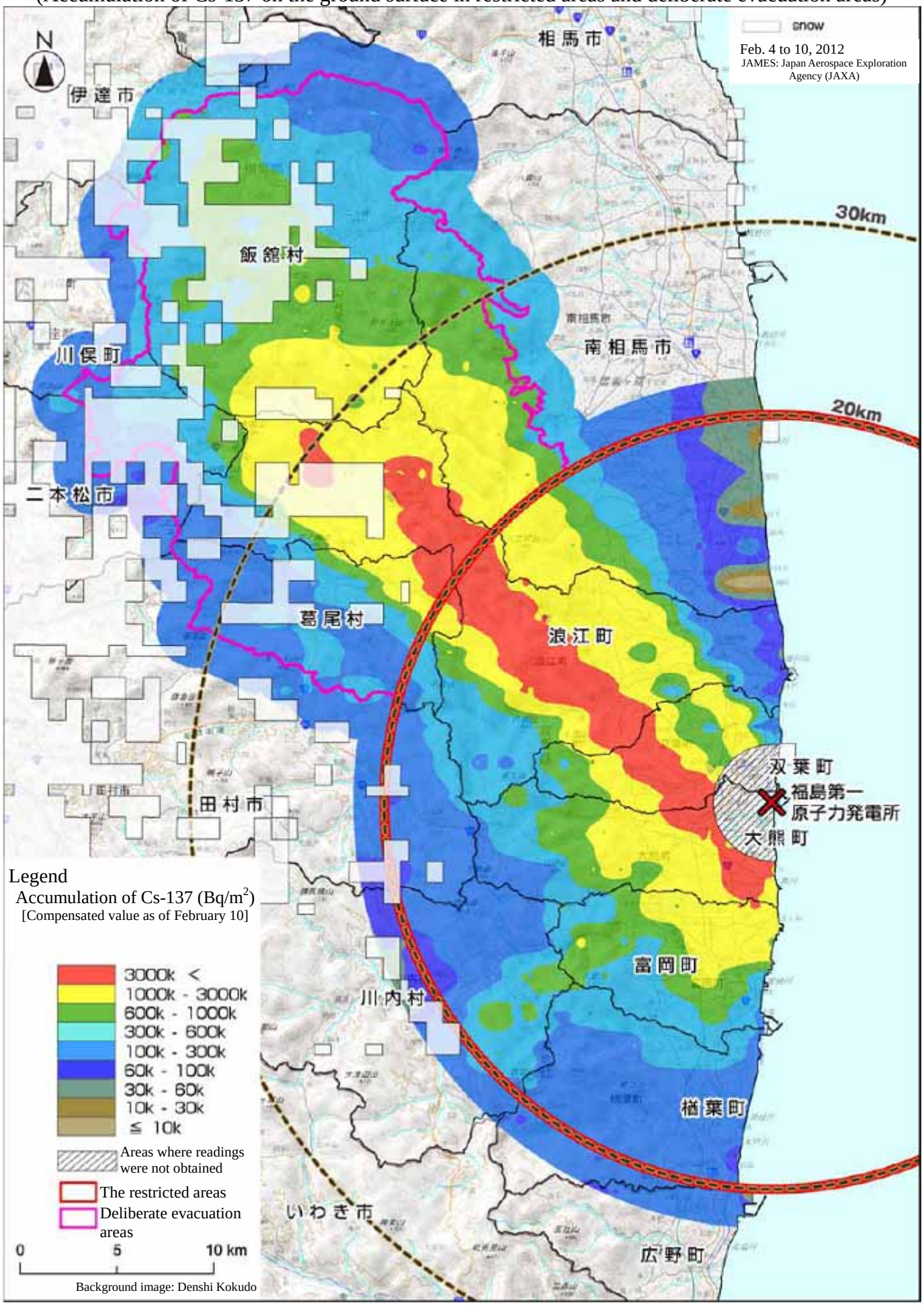


*The areas in white demarcated with solid lines are those covered with snow. The deposition of radioactive cesium in these areas, which is assessed based on the measurement results of air dose rates that have been reduced due to snow coverage, may be reduc。

Attachment 4

Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas

(Accumulation of Cs-137 on the ground surface in restricted areas and deliberate evacuation areas)

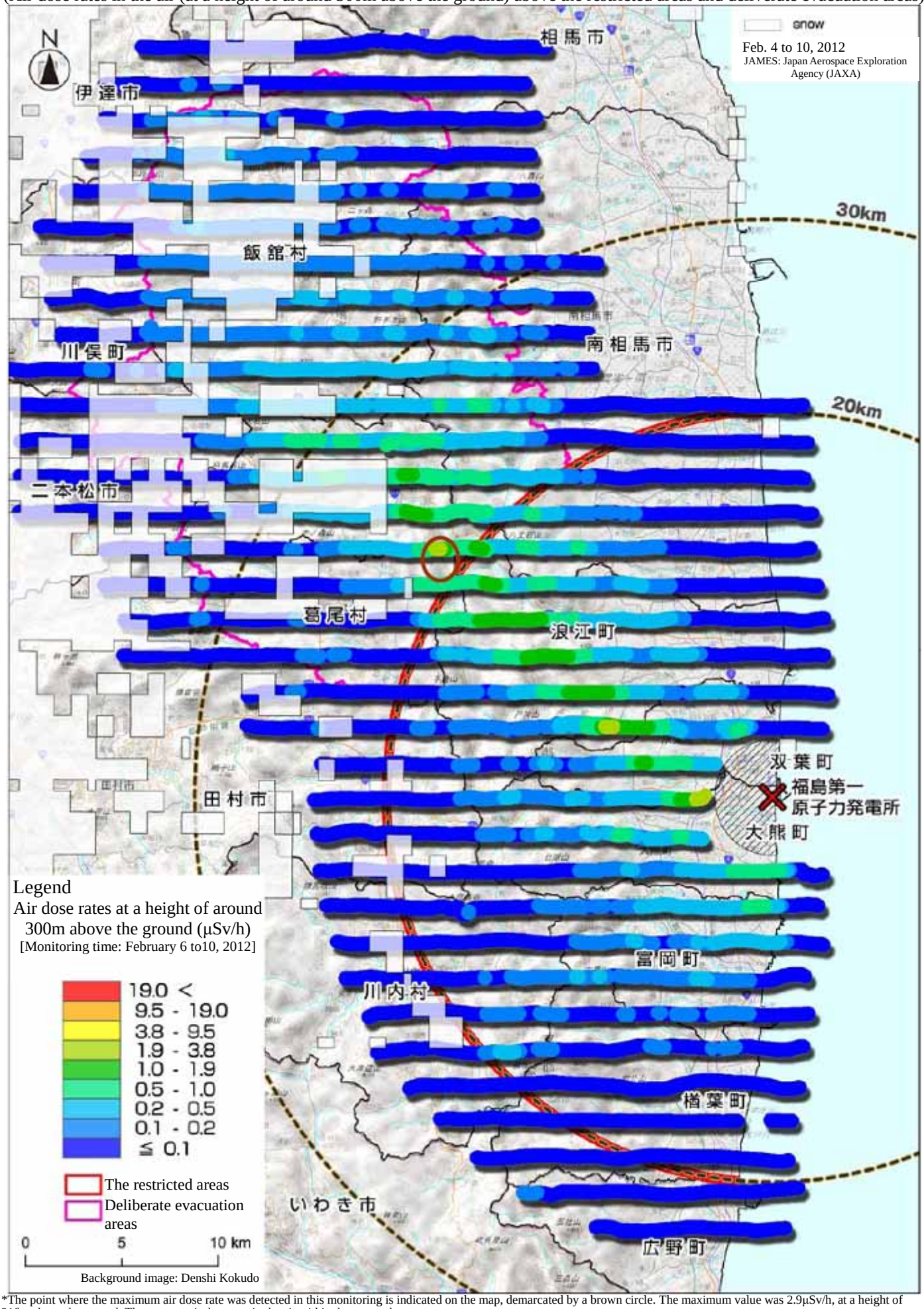


*The areas in white demarcated with solid lines are those covered with snow. The deposition of radioactive cesium in these areas, which is assessed based on the measurement results of air dose rates that have been reduced due to snow coverage, may be reduc。

Attachment 5

Results of Airborne Monitoring in Restricted Areas and Deliberate Evacuation Areas

(Air dose rates in the air (at a height of around 300m above the ground) above the restricted areas and deliverate evacuation areas)

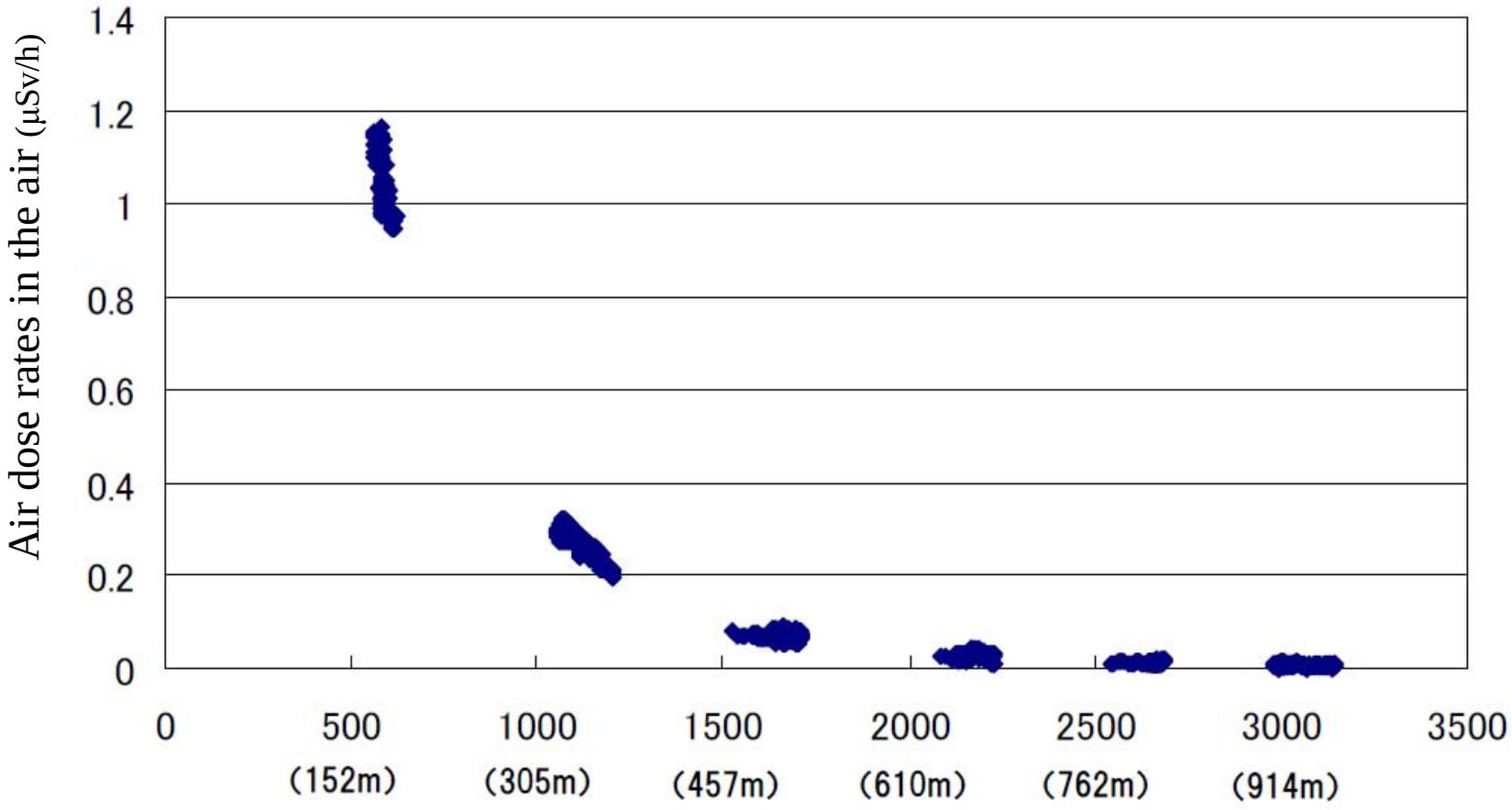


*The point where the maximum air dose rate was detected in this monitoring is indicated on the map, demarcated by a brown circle. The maximum value was 2.9μSv/h, at a height of 216m above the ground. The average air dose rate in the air within the targeted。

*The areas in white surrounded with solid line are those covered with snow. Air dose rates in the air around these areas may have been reduced due to snow coverage compared to the time when there was no snowfall.。

A ttachment 6

Air dose rates measured at each height above the ground



*Air dose rates in the air are the values measured at each height inside a helicopter, while hovering above the test line.