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Operational experience of CTBTO related to the Fukushima nuclear accident and long term perspectives

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Effects of Earthquake, Tsunami and Fukushima NPP accident on CTBT network

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- Seismic detection of Earthquake of magnitude nine March 11 2011 and subsequent several thousand aftershocks
- Hydroacoustic detection showing the rupture forming under the sea
- Infrasound detections showing the explosions in the Fukushima NPP
- Subsequent radioactivity measurements in all the Particulate and Noble gas stations on northern hemisphere and some on Southern Hemisphere.
- Atmospheric transport modeling played important role during the first day as there was a need to see which stations are going to be affected by the release.

Atmospheric transport model for the release

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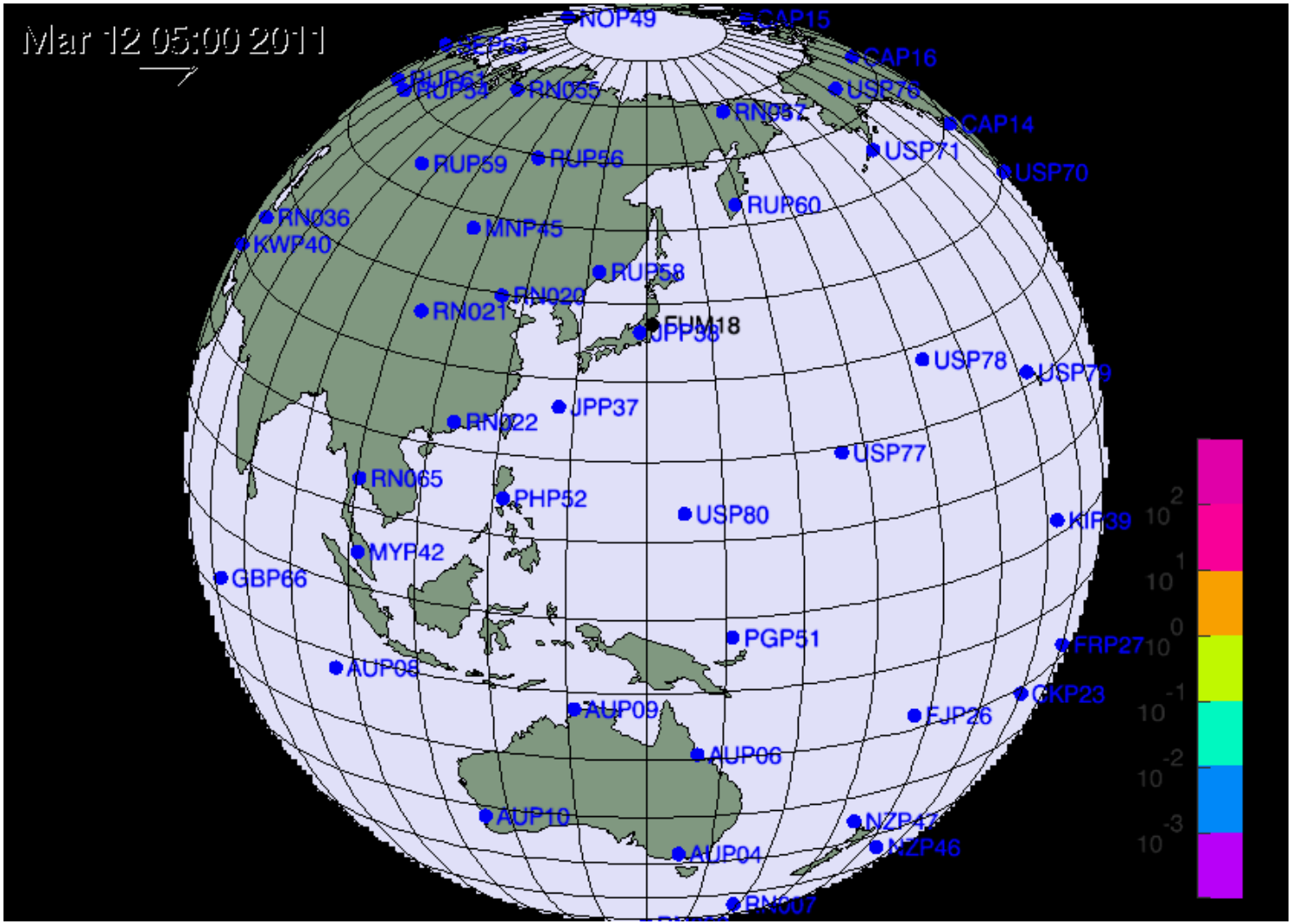

Detected isotope concentrations on JPP38, Takasaki, Japan

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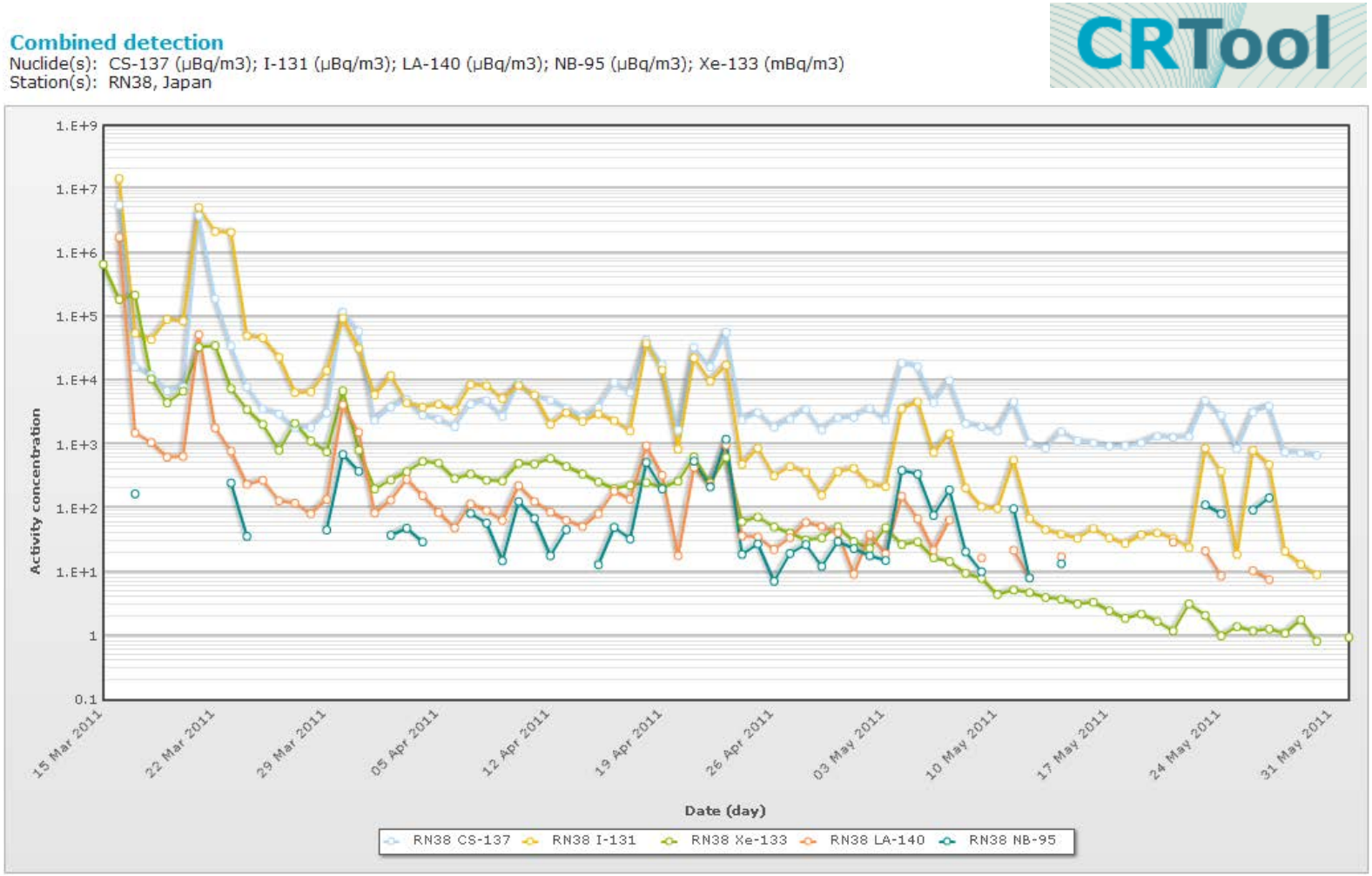
CRTool



The station is 200 km SW from Fukushima. The radiation levels detected are low in the global scale.

Isotope ratios, JPP38, Takasaki, Japan

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Cs-134 to Cs-137 is behaving smoothly: predominantly same type of source material.

Cs-136 to Cs-137 ratio has some variation, this may indicate that source material has a mixture of different irradiated batches of fuel.

Cs-134/Cs-137

I-131/Cs-137

Cs-136/Cs-137
Nb-95/Cs-137
La-140/Cs-137
Te-132/Cs-137

No significant change in metallic elements vs. Cs-137 ratio, gaseous fission products are dominating.

Particulate detections at the IMS network

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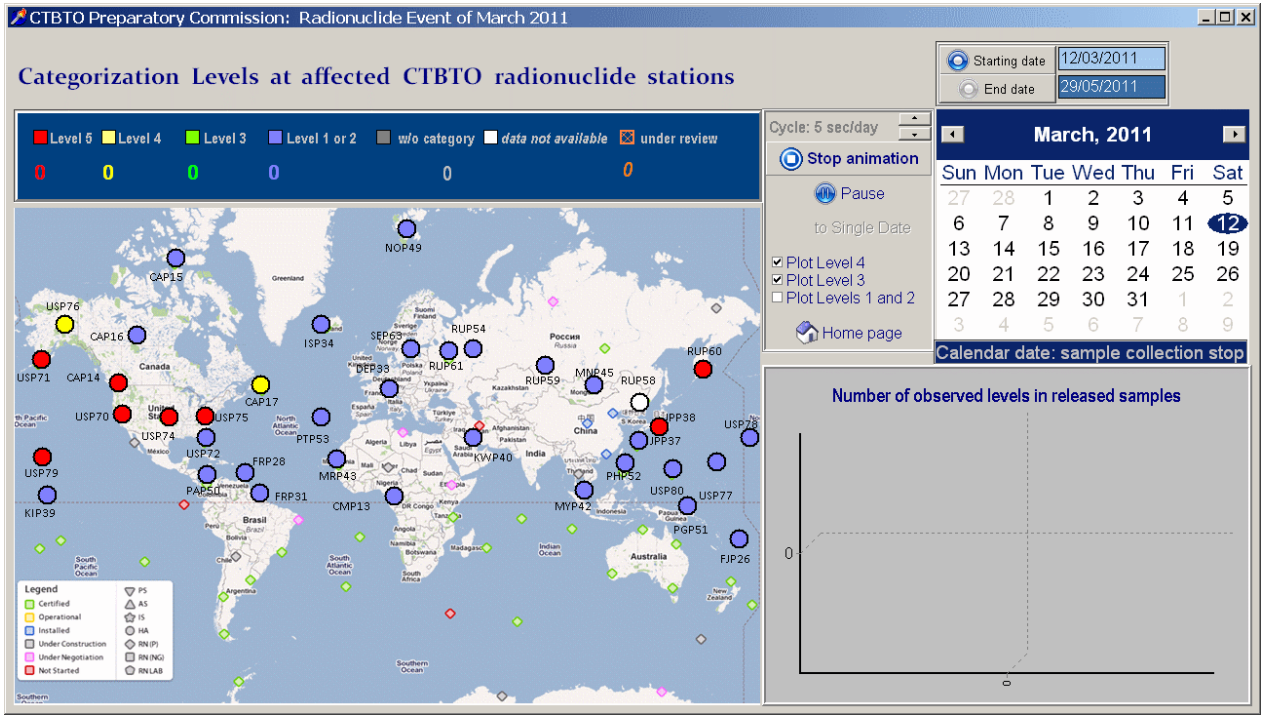
This picture show time development of detections for each day after the accident.

Level 5 = multiple fission products detected, **Level 4** = one fission products detected,

Level 3 = fission products typical for the station detected

Level 1 and 2 = only natural radioactivity detected



Situation in the end of May, more than 40 stations have detected the event and all but closest station (Takasaki, Japan) are back to normal background radiation. More than 1600 samples contained radiation originating from Fukushima NPP.

Future perspective

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The CTBTO was and still is involved in the worldwide response to the Fukushima events

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Which potential role for the organization in the future – which possible steps next?

Which CTBTO contribution to preparedness and response activities at the international level in case of nuclear emergencies?

CTBTO response to the situation

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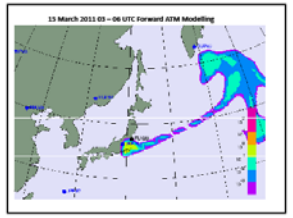
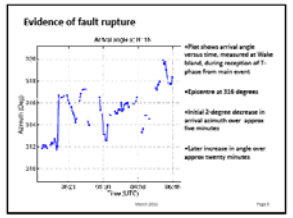
- On 11.3.2011 CTBTO has had to face a situation similar to the Indonesian tsunami (2004-12-26) namely sharing data for humanitarian purposes vs. confidentiality policy
- CTBTO based its technical response on its experience resulting from the 2006 and 2009 DPRK events.
- 6 Briefing meetings to CTBTO Member States → in these briefings Member States supported and urged CTBTO to share the data with IAEA
- Already the first briefing 15.3.2011 had information on atmospheric transport and first traces had been detected in IMS system.
- Effective technical co-operation with the IAEA started March 21
- Number of technical meetings were arranged thereafter between IAEA/WMO/WHO/ODA/CTBTO concerning detected concentrations in the IMS network, source term estimate, isotopic ratios and atmospheric transport model based dispersion estimates

3/15/2011





Information given in the first briefing to the Member states 15.3.2011

Inter-Agency Committee on Radiological and Nuclear Emergencies

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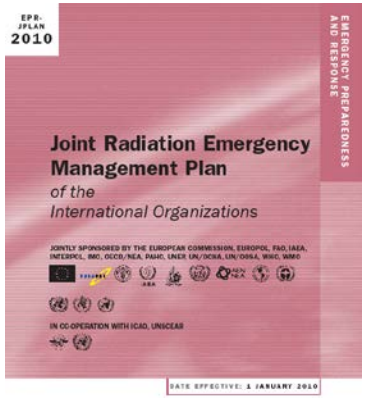
CTBTO was not involved at all in emergency preparedness and response activities coordinated by the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) prior to 11 March 2011.

IACRNE is based on the respective mandate of each organization involved in such emergencies and based on both "post- Chernobyl" conventions namely the "Early Notification Convention" and the "Assistance Convention"

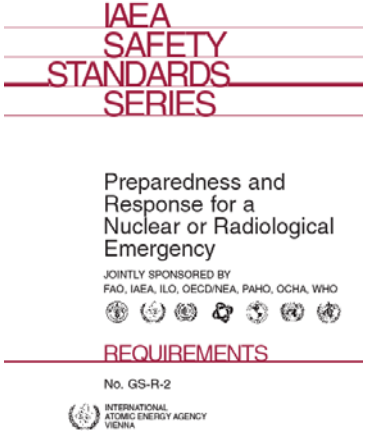
Series of bilateral agreements (refer to Appendix A of the IACRNE Joint Radiation Emergency Management Plan)

IAEA as secretariat of IACRNE (routine conditions) and as "focal point" (emergency conditions).

CTBTO has participated to IACRNE meetings since 11.4.2011



IAEA International Atomic Energy Agency



(iaea.org)

Possible ways forward

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- Consider formalizing membership to the IACRNE and associated bilateral agreements with IAEA and WHO.
- Consider Updating the 2003 agreement between WMO and CTBTO to take into account nuclear and/or radiological emergency situations. Find a solution on how WMO Regional Specialized Meteorological Centers (RSMC's) could access the data to support decision making.
- Consider membership to the Early Notification Convention and the Assistance Convention
- Maintaining active contribution to the post-Fukushima activities which will be very likely undertaken by the IACRNE members, in particular:
  - International reports on radiological consequences
  - Possible update of the Joint Radiation Emergency Management Plan based on feed back experience and lessons learned drawn and shared by each IACRNE member and reflecting the CTBTO contribution
- Confidentiality question could be addressed in a similar manner as it was for the "tsunami alert" arrangements.
- All these activities should not affect the primary role of the CTBTO

Conclusions

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- CTBTO information was found to be very useful for emergency situation. This was a side-product of CTBT verification system. Reliability and robustness of the CTBTO products resulting from:
  - High level requirements for equipment as well as for data processing and transmission
  - Continuous daily monitoring of CTBTO activities by the NDCs

  → The highest assurance level of transparency and independence
- An effective and efficient response to nuclear emergencies requests appropriate and validated preparedness arrangements

  → GET PREPARED

→ Consider establishing a formal and documented internal emergency response structure within CTBTO to support and maintaining the links with the IACRNE members involved.