

Some lessons from the ICRP Dialogue Initiative in Fukushima

Thierry SCHNEIDER

EURADOS Annual Meeting AM2015

***Winter School "The Fukushima Daiichi nuclear accident -
the role of dosimetry in assessing the consequences"***

Dubrovnik, 12 February 2015

- In fall 2011, ICRP initiated a series of Dialogues between representatives of the Fukushima Prefecture, local professionals, local communities, and experts in radiation protection from Japan and abroad.
- The aim of this dialogue is to find ways to respond to the challenges of the long-term rehabilitation of living conditions after the Fukushima accident.
- Initiative organised in cooperation with IRSN, ASN, NRPA and the Committee on Radiation Protection and Public Health of NEA/OECD.
- Up to now, 10 Dialogue seminars have been organised in the Fukushima Prefecture.

- For the local communities, the preliminary lessons from these Dialogue seminars point out:
 - The specific role of the access to reliable information on the local radiological situation
 - The role of experts in the development of co-expertise processes to move from the explanation of the situation, to actions for improving this situation.

12 ICRP Dialogue seminars (1)

- Rehabilitation after the Fukushima Accident: Lessons from Chernobyl and ICRP Recommendations (Nov 2011, Fukushima City)
- Accomplishments in Date City, and obstacles to and opportunities for further improvement (Feb 2012, Date City)
- Foodstuff: Examining the challenges (Jul 2012, Date City)
- Education of children (Nov 2012, Date City)
- To return or not, to stay or leave (Mar 2013, Date City)
- Focus on Iitate (Jul 2013, Fukushima City)

12 ICRP Dialogue seminars (2)

- Self-help actions in Iwaki and Hamadōri (Nov 2013, Iwaki City)
- The situation and challenges of Minami Soma (May 2014, Minami Soma City)
- Raising children in Fukushima (August 2014, Minami Soma City)
- The value of tradition and culture in Fukushima (Dec 2014, Date City)
- *To be defined* (May 2015)
- *To be defined* (Sept 2015)

ICRP Dialogue seminar – Nov. 2012



ICRP Dialogue seminar – March 2013



ICRP Dialogue seminar in Iwaki – Nov. 2013

- Testimonies of Suetsugu residents -



- Disturbances of the daily life
- Role of co-expertise
- Some feedbacks on external dosimetry
- Some feedbacks on food monitoring
- Some feedbacks on internal dosimetry
- Conclusion

Disturbances of the daily life (1)

- The Chernobyl accident and the Fukushima accident show that the long-term management of their consequences is not straightforward
- The human consequences are very similar:
 - Loss of confidence in authorities and experts
 - Strong worry about health and especially of children health
 - General feeling of discrimination and exclusion
 - Feeling of helplessness and abandonment
 - Loss of control on daily life and apprehension of the future

Disturbances of the daily life (2)

- The technical answer to improve the radiological situation has indirect effects that isolate affected people from their day-to-day environment:
 - Decontamination, interdictions, restrictions, controls of food,...
- The main key issues to be addressed by each inhabitant:
- To continue to live in the affected territories or to leave them
 - To return or not at home
- Need to evaluate the possibility to work and to produce in the contaminated territories
- Need to consider the new conditions in comparison to the situation prevailing before the accident

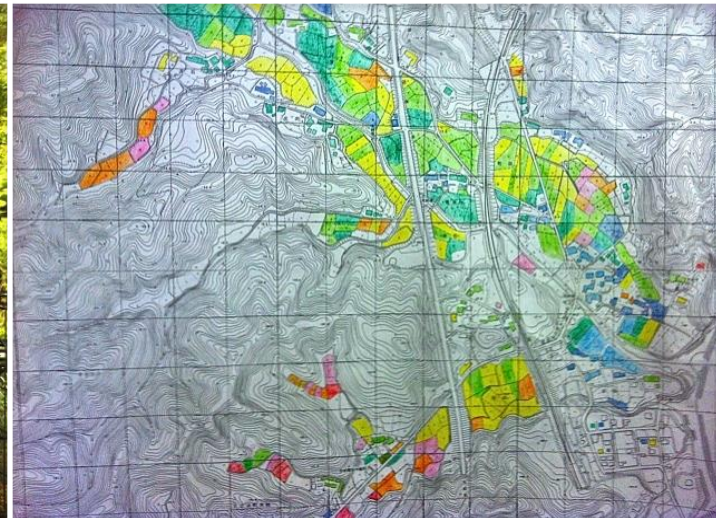
- The process of co-expertise relies on:
 - Establishment of places for dialogue allowing experts to listen and discuss together with affected people their questions, concerns, challenges, but also expectations
 - Assessment conducted jointly by locals and experts on the situation of the people and their community
 - Implementation of projects to address the problems identified at the individual and community levels with the support of local professionals, experts and authorities
 - Evaluation and dissemination of results

- Co-expertise leads to promote the practical radiological protection culture within the affected communities, defined as:
The knowledge and skills enabling citizens to make choices and behave wisely in situations involving potential or actual exposure to ionizing radiation
- This progressively allows everyone to:
 - Interpret results of measurements: ambient levels, external and internal doses, contamination of products
 - Build her/his own benchmarks against radioactivity in day-to-day life
 - Make her/his own decisions and protect her/himself and loved ones = self-help protection
- Access to measurements by the people with suitable devices is critical

- In Fukushima, it seems that the co-expertise process has been implemented only in a few communities that gradually engaged themselves in concrete local projects
- This process has evolved in a similar way to that of Belarus, however with differences regarding:
 - Personal engagement of voluntary experts and local professionals at the service of the population
 - Means for measurement to characterize the radiological situation
 - Sharing of information via social media

Meeting in Suetsugi with ICRP – July 2012

- Questions and concerns -



Some feedbacks on external dosimetry (1)

- The zoning of the territories is based on average level of contamination
- To have a grip on the local situation, the ICRP Dialogue seminars have clearly acknowledged:
 - Importance of developing individual external dosimetry using electronic dosimeters
 - Contribution of the individual monitoring to regain confidence on the situation and to adapt individual own behaviour
 - Key role of sharing and interpreting the results within the community with the support of experts

Some feedbacks on external dosimetry (2)

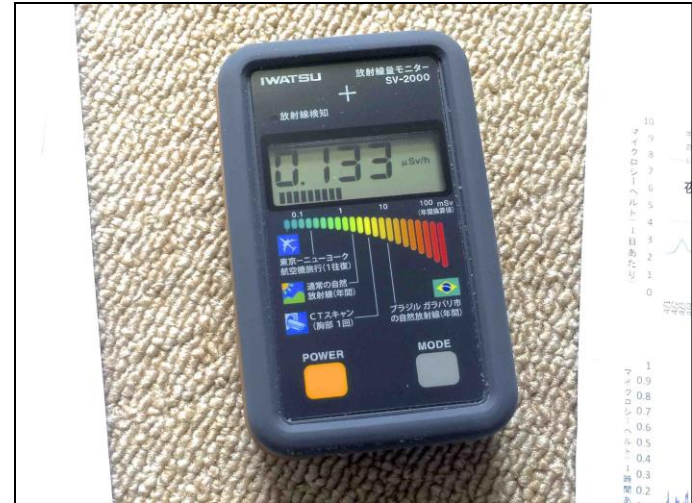
- For populations living in the affected territories, the use of individual dosimeters has resulted to better understand the contribution of the various locations:
 - Contribution of home, schools, forests, place of work... in the external doses
- For most of the people, the integrated external dose is rather low
- Two issues are at stake:
 - Which modification of habits or further decontamination are meaningful for improving the situation?
 - What are the levels of individual exposures in other locations in Japan or abroad?

Meeting in Suetsugi – November 2012

- Discussion on first measurements of external dose -



Assessment of external exposure by citizens in Suetsugi

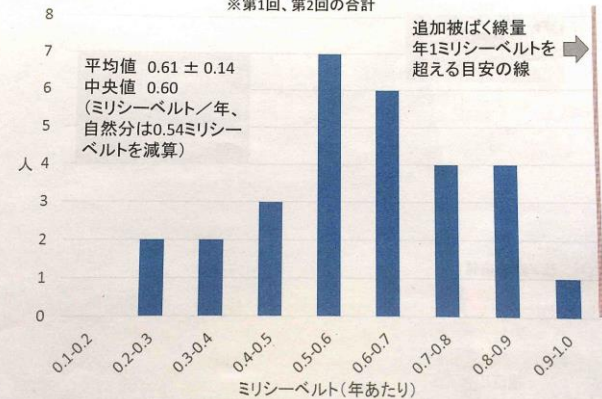


積算値を変える要因は生活にある

1日平均積算量 (マイクロシーベルト/日)	年間推測追加被ばく量 (ミリシーベルト/年)	参考: 前回の推測
2.40	0.33	-



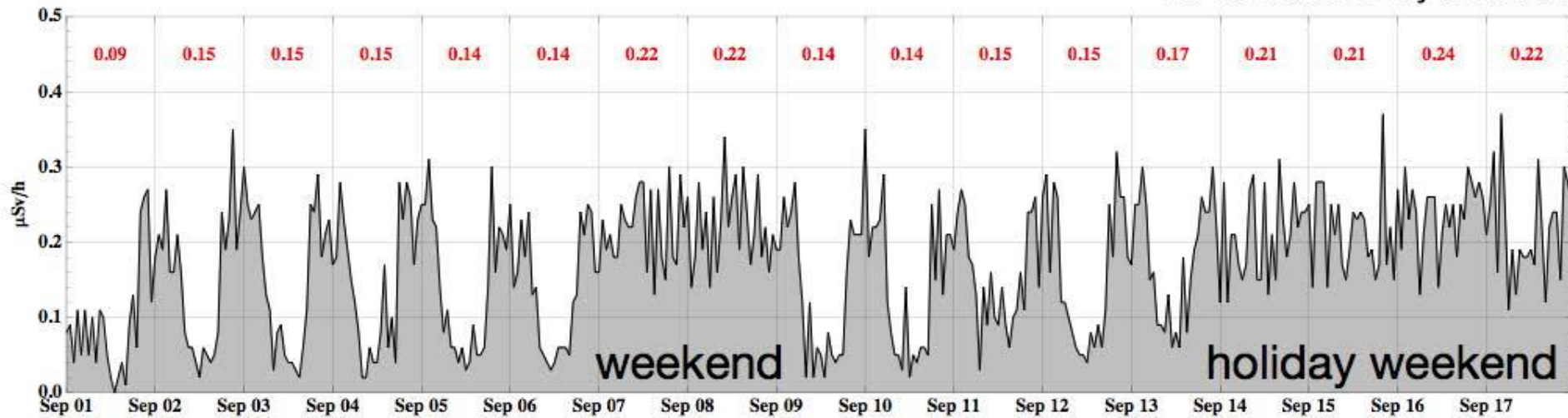
年間追加被ばく線量の分布 (推定, ミリシーベルト) ※第1回、第2回の合計



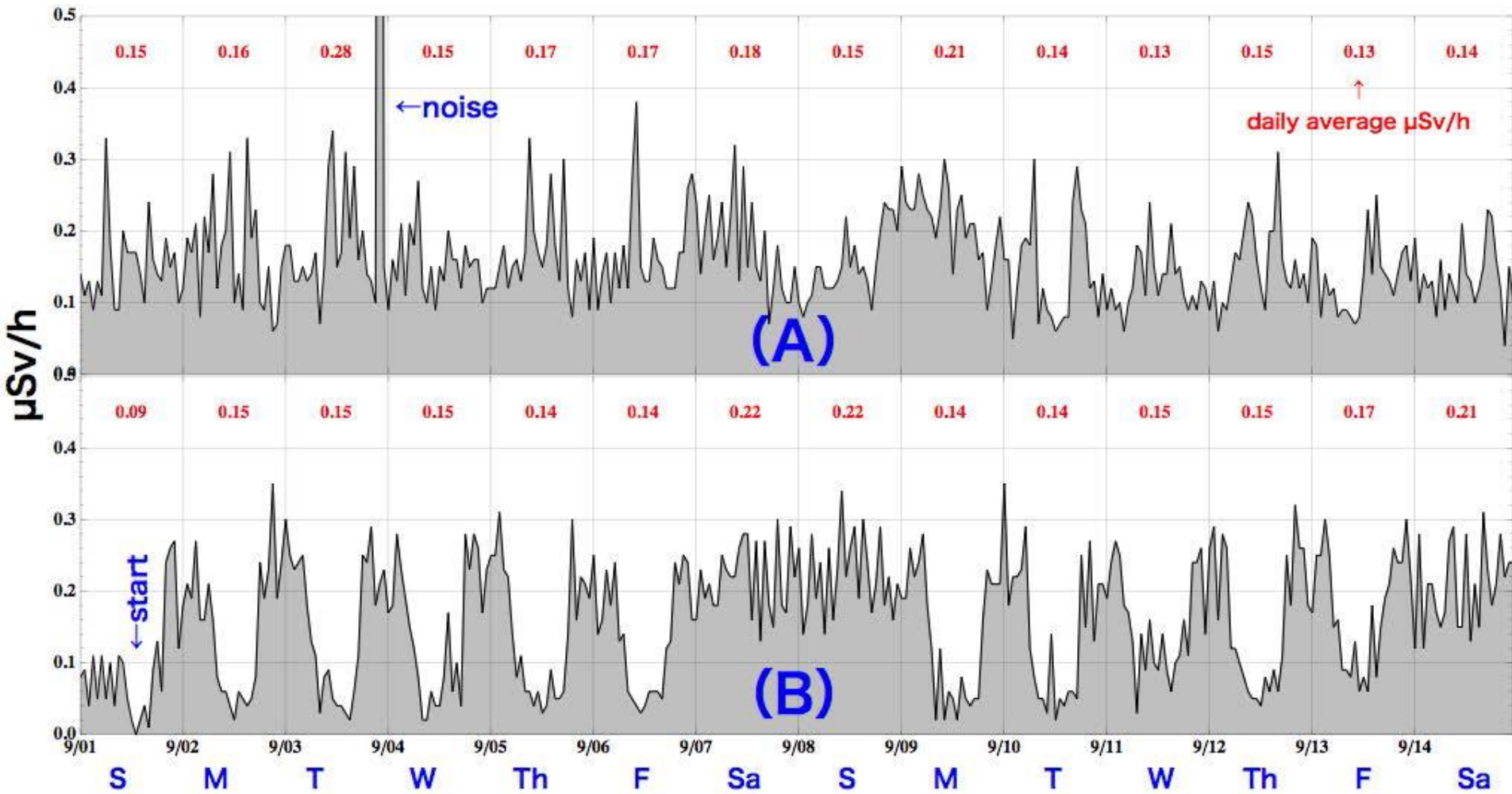
Personal dosimeter with 1-hour integrated-dose readout



a Fukushima city resident



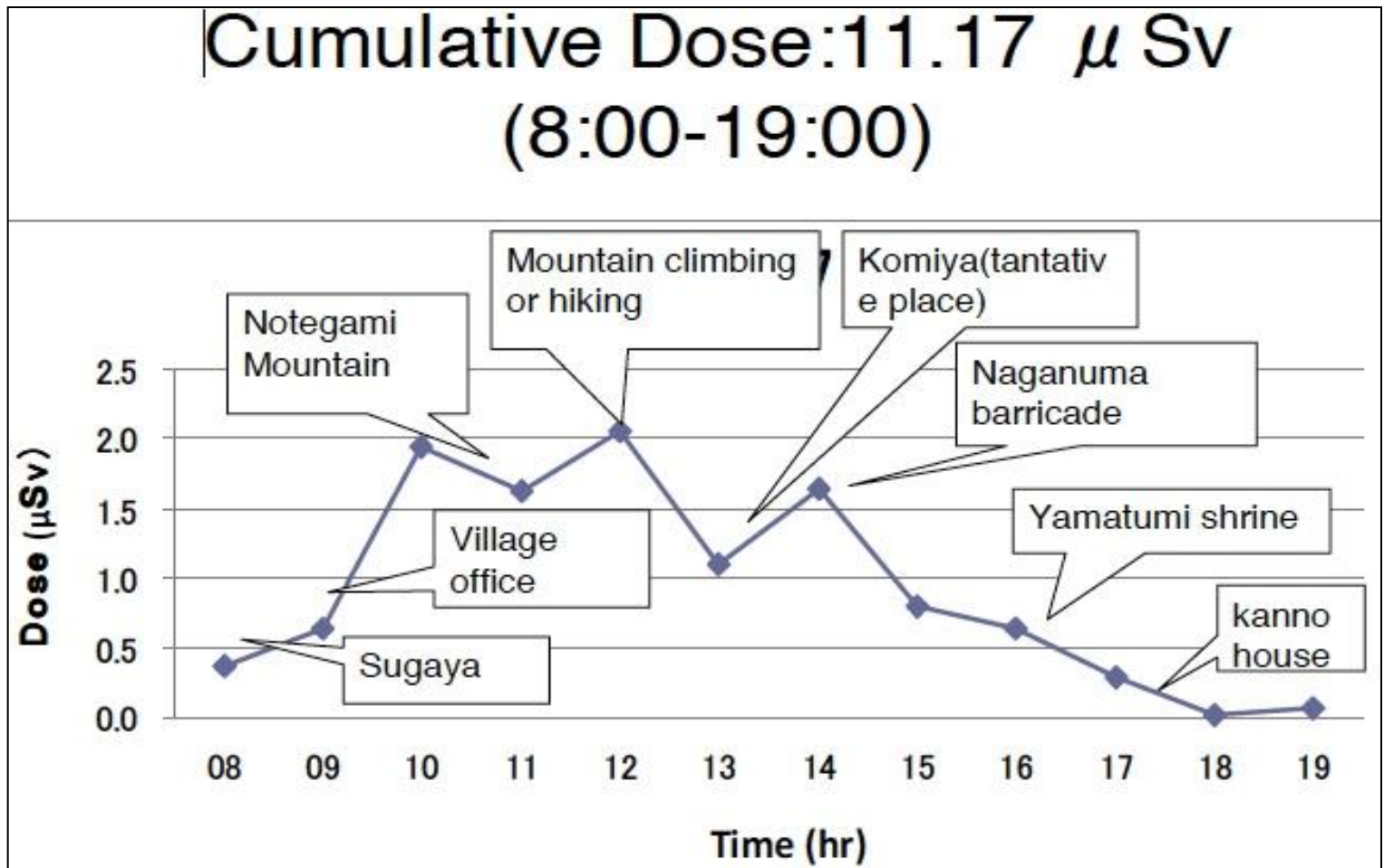
A - farmer living in the ex-exclusion zone
B - office worker in Fukushima city



Some feedbacks on external dosimetry (3)

- For people evacuated from their homeland, individual external dosimetry programme is crucial for providing meaningful information on the future of their life if they will come back to their places.
- Experimental programmes currently underdevelopment to better anticipate the possible distribution of individual external exposures according to the type of activities and habits.
- Allow to identify the contribution of decontamination actions and the remaining hot spots contributing to increase individual exposures.

Assessment of external exposure in litate



Some feedbacks on external dosimetry (4)

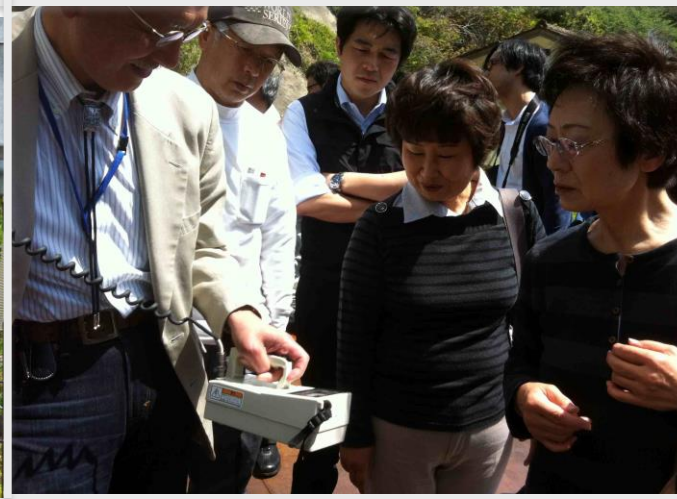
- External dosimetry: a key role for establishing surveillance programme for wastes discharges associated with decontamination actions.
- Due to the large volume of wastes and the large number of temporary storages, local populations are concerned with the possible consequences on their local environment.
- Specific actions have been implemented in different locations such as Suetsugi or Date City in order to favour a common assessment of the external dosimetry.

Suetsugi – March 2013

- Visit of the decontamination waste disposal site -



Visit of the temporary storage of the Iwaki incinerator fly ashes



Some feedbacks on food monitoring (1)

- Following the Chernobyl accident, food contamination has induced significant internal doses mainly for rural populations
- Also the case in some specific areas and populations such as the Sami population in Norway
- After the Fukushima accident, large concern of the Japanese population on the possible contamination of food.
- Besides the low reference levels of radionuclide concentration adopted for the trade of food, a large development of monitoring systems has occurred:
 - Significant development of private monitoring places
 - Installations of devices by different municipalities.
 - Producers and retailers have set up themselves a powerful system (notably for rice)

Measurements of soil contamination and ambient dose rates in rice paddies early 2012



Borrowed from Shinya Endo

Meeting with ICRP – July 2013

- Measurements of the products of local gardens -



Involvement of consumers (1)



Involvement of consumers (2)



Hayashi, Koyama, Ishii et al, 2014

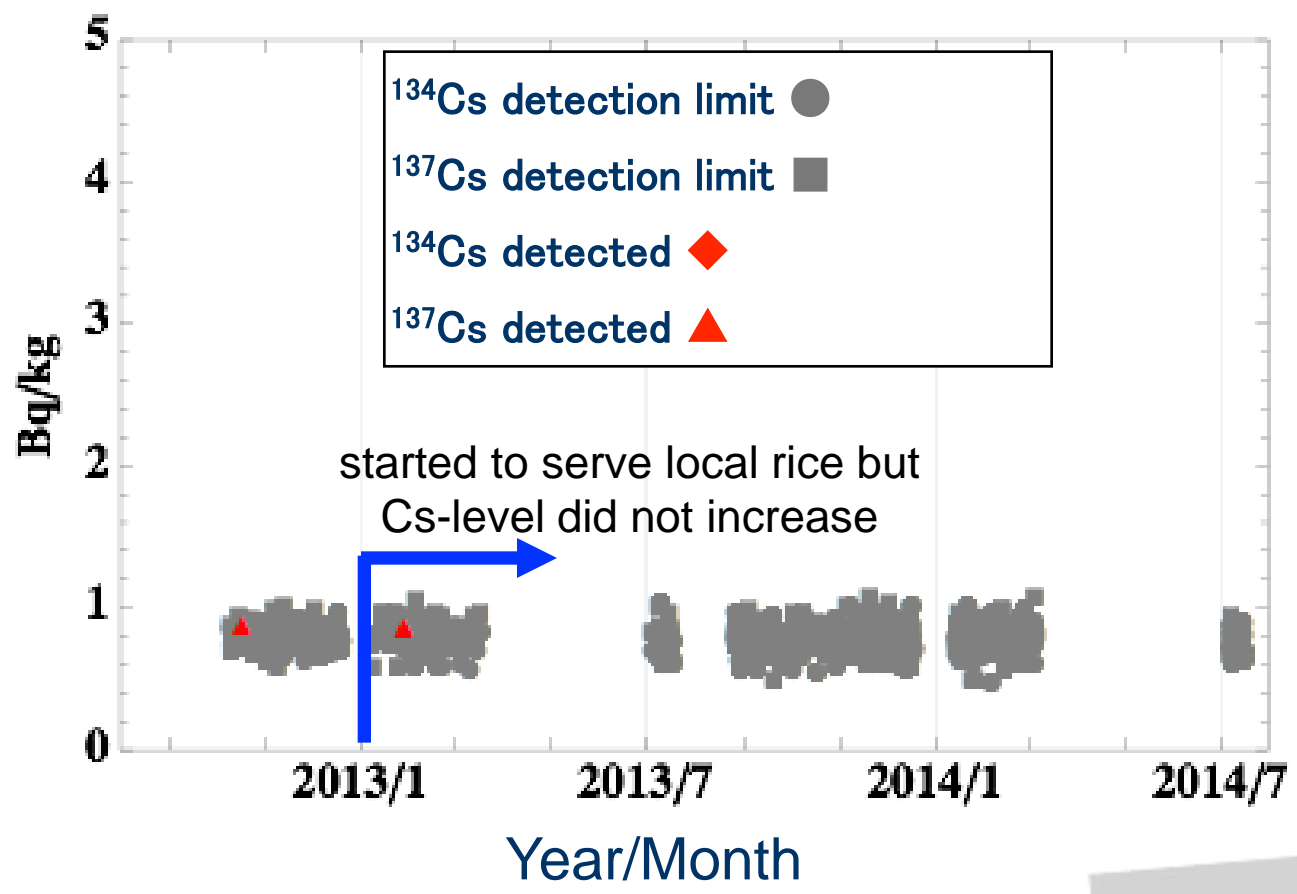
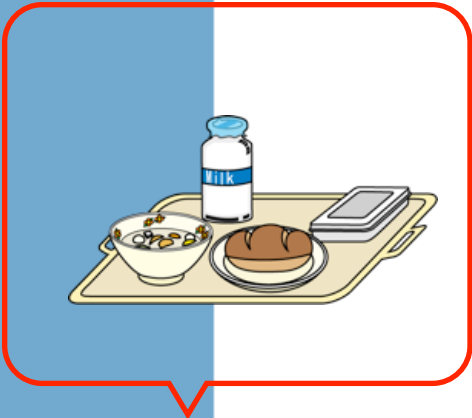
Some feedbacks on food monitoring (2)

- Monitoring of daily meals performed by Co-op Fukushima on the basis of the monitoring of “duplicate diet” with the participation of consumers from the Fukushima Prefecture
- Such experiments have progressively improve the capability of consumers to regain confidence on the food coming from the market.
- More complex situation for fish and seafood, largely associated with the management of the discharges from the damaged nuclear power plant.

An example: Fukushima city school lunch *(From R. Hayano)*

results of other municipalities are similar:

Fukushima school lunches are practically free of radiocesium



Some feedbacks on food monitoring (3)

- Low levels of contamination observed for most of the food products, notably due to:
 - Restriction of production in significantly contaminated areas,
 - Nature of the soil
 - Decontamination programmes
- In this context, a tendency to promote the products with levels of radionuclide concentration largely below the reference levels.
- Non organic producers federations have engaged reflections on the organisation of the monitoring in the perspective of promoting their products.



Food “festival” in Fukushima Prefecture in 2013

Hayashi, Koyama, Ishii et al, 2014

36 Promotion of Fukushima local products with photos of producers



(Source: Coop-Fuku)



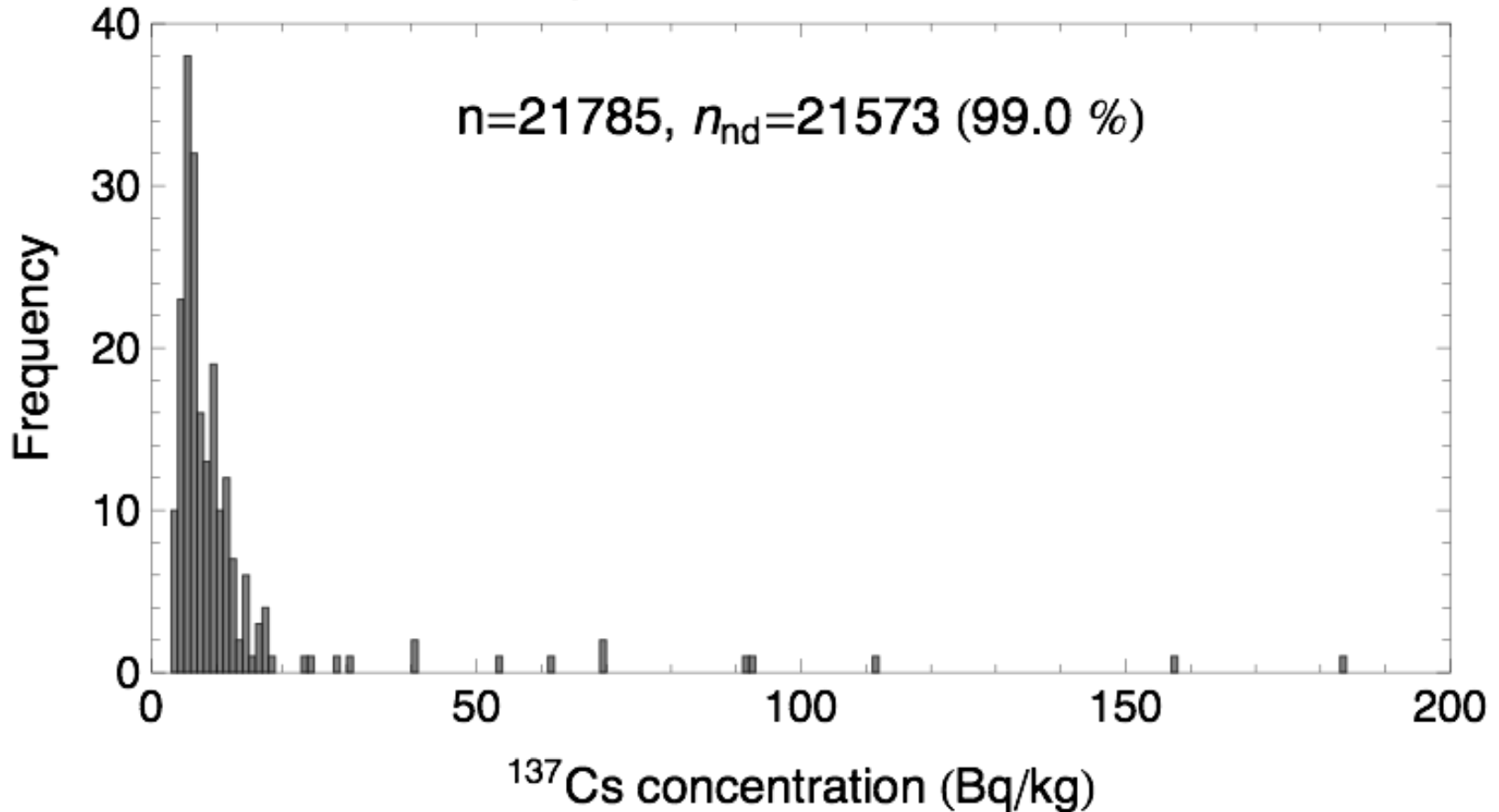
Presentation of organic vegetables produced in the affected territories, 7th Dialogue meeting in Iwaki

Some feedbacks on internal dosimetry (1)

- Expectation of internal exposures of a few mSv/y, based on the feedback experience of the Chernobyl accident, for populations living in the vicinity of the Fukushima damaged nuclear power plant.
- Whole body monitoring surveys performed during the first year after the Fukushima accident show a large part of the measurements below the detection levels of 300 Bq/body.
- These results are in agreement with the contamination observed in food products.

Results of Hirata Central Hospital (near Koriyama c.) using the 2nd FASTSCAN

All subjects: Mar 2012–Nov 2012



Some feedbacks on internal dosimetry (3)

- Development of whole body monitoring limited during the following months after the accident due to lack of equipment and lack of trained professionals.
- Progressively, several radiation protection experts and medical doctors have set up a network to favour:
 - Common evaluation of the situation
 - Dialogue with the inhabitants and local communities
- Whole body monitoring is used as a mean for assessing the efforts of protection
 - Notably for individuals eating their own production or products from the forest, notably the sansai, a traditional Japanese forest plant.

Some feedbacks on internal dosimetry (3)

- Specific development of devices dedicated to baby:
babyscan
- Performed under the leadership of Pr. Hayano from Tokyo University.
- Developed in response to the worry expressed by mothers
- Not necessary for detecting contamination of baby as far as the measurements of adults may be sufficient
- But essential for reassuring the mothers and engaging a dialogue on radiation protection issues with them

OPEN ACCESS

IOP Publishing | Society for Radiological Protection

Journal of Radiological Protection

J. Radiol. Prot. **34** (2014) 645–653

doi:10.1088/0952-4746/34/3/645

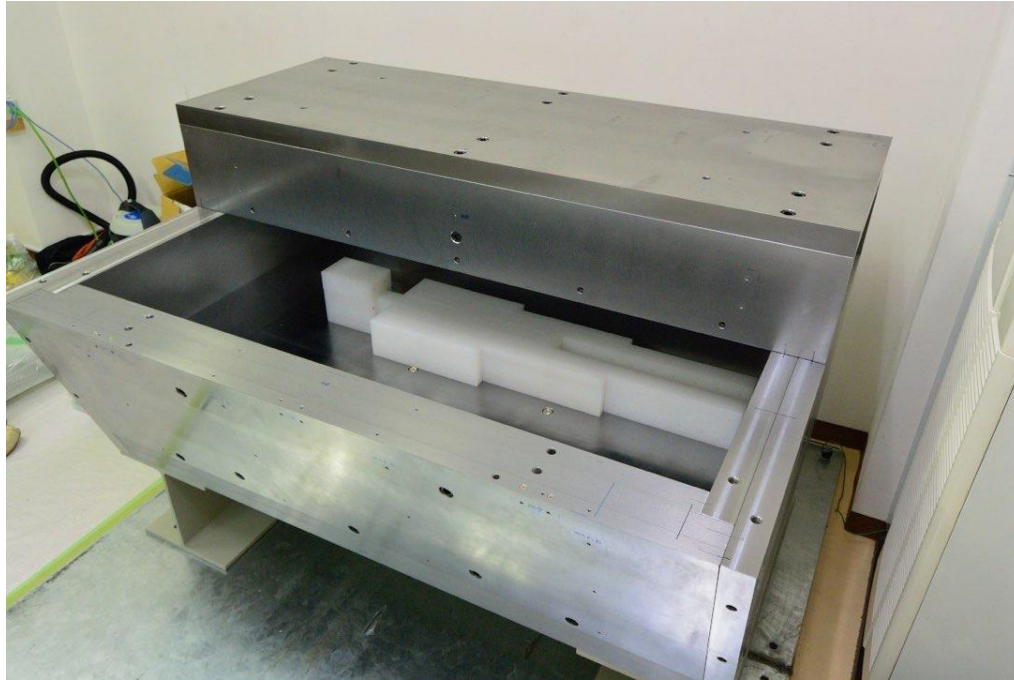
BABYSCAN: a whole body counter for small children in Fukushima

Ryugo S Hayano¹, Shunji Yamanaka², Frazier L Bronson³,
Babatunde Oginni³ and Isamu Muramatsu⁴

Development of the Babyscan



BABYSCAN - highly sensitive WBC



- ▶ 6 t of shielding (low background)
- ▶ 4 large Nals (high detection efficiency)
- ▶ small children (height < 130 cm) lie on the bed for 4 minutes
- ▶ detection limit $\ll 50$ Bq/body
- ▶ radiocesium was not detected in any of the $\sim 1,000$ Fukushima children scanned so far
- ▶ *From R. Hayano*

Communication is the key



Dr. Masaharu Tsubokura, Minamisoma

- ▶ Minamisoma: >1000 families are on the waiting list
- ▶ the ^{40}K result is helpful in explaining the result
- ▶ a large fraction of parents (still) ask about the safety of tap water
- ▶ *From R. Hayona*

- The preliminary lessons from the ICRP Dialogue seminars point out the importance of developing monitoring strategies adapted to the needs of local inhabitants.
- In the post-accidental context, some crucial points are:
 - Availability of equipment,
 - Training of experts
 - Development of places of dialogue.
- Some issues to be dealt with in the perspective of post-accidental preparedness:
 - How to share the information, including the role of social media?
 - How to help the interpretation of the results?

The foundations of Ethos in Fukushima

2nd Dialogue meeting, Date City, February 2012

Two Wheels: Ground and Net



Net

Ground

Source: Ethos in Fukushima

- For further information:
 - www.icrp.org
 - <https://twitter.com/hayano>
 - <http://ethos-fukushima.blogspot.com/>

***THANK YOU
FOR YOUR ATTENTION***