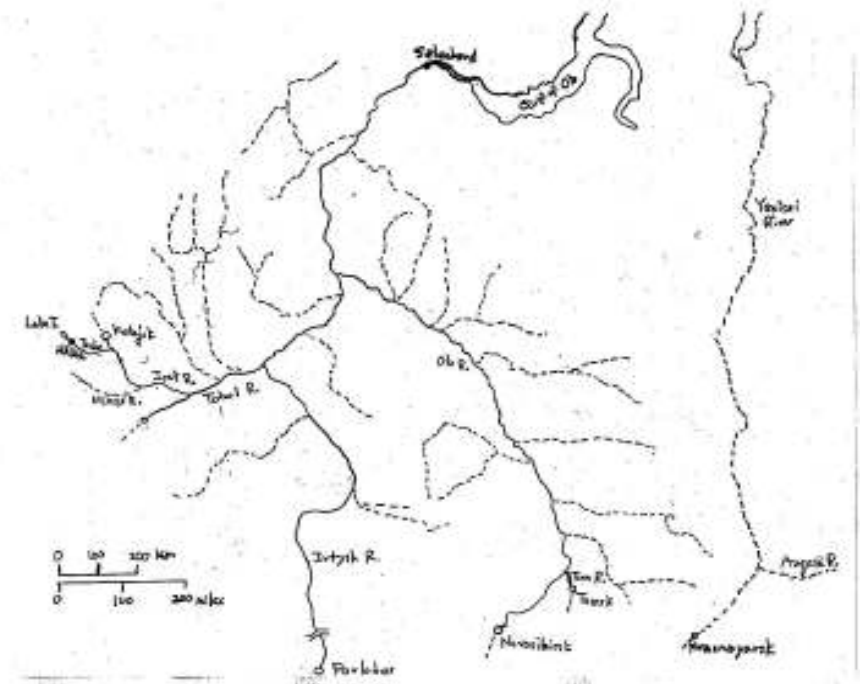


# Mayak Site in Russia

- ◆ 1949~1956; Discharged radionuclides to rivers:
  - The Techa, Isset, Tobal, Irtysh, Ob rivers and Kara Sea
  - Livestocks pastured in the Techa river floodplain (Radiation exposure: 35~1700m Sv)
  - Higher radiation levels in floodplains of Fukushima river: It needs to evaluate its radiation impact to people)
- ◆ 1957: Radioactive waste storage tank explosion
  - Released 1/3 of Fukushima radionuclide release
- ◆ 1950s: Radionuclides discharged to Lake Karachoi from 1950
  - 30 times more radionuclides discharged to the lake than Fukushima accident released amount

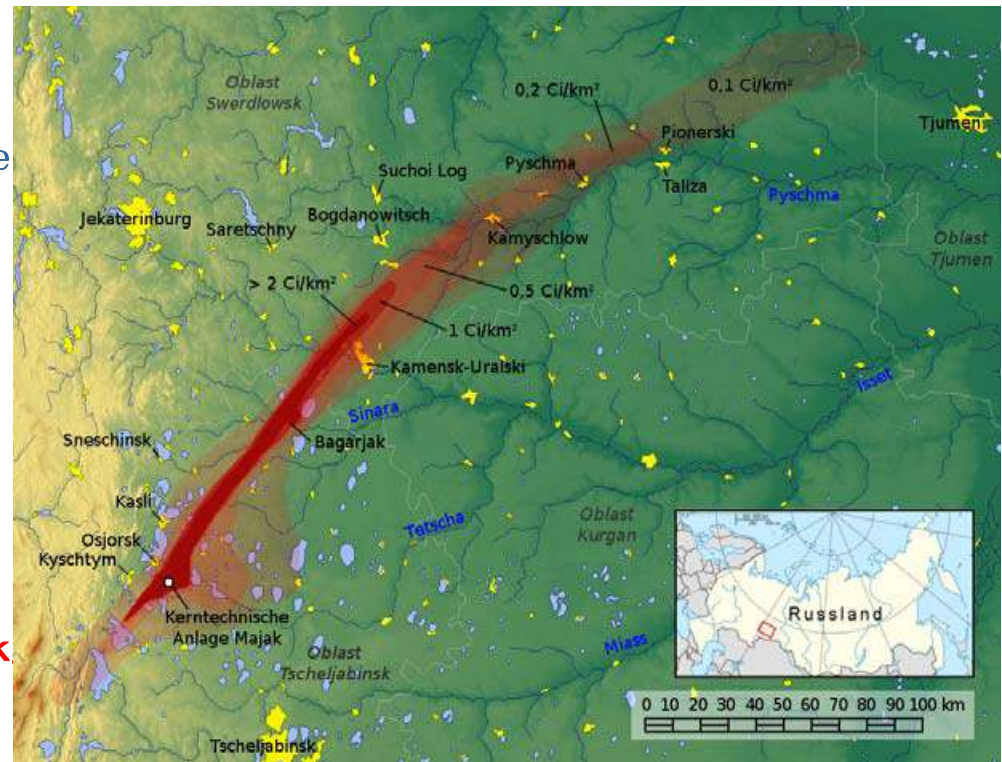


# Mayak Site : 1957

## High-Level Radioactive waste storage tank explosion

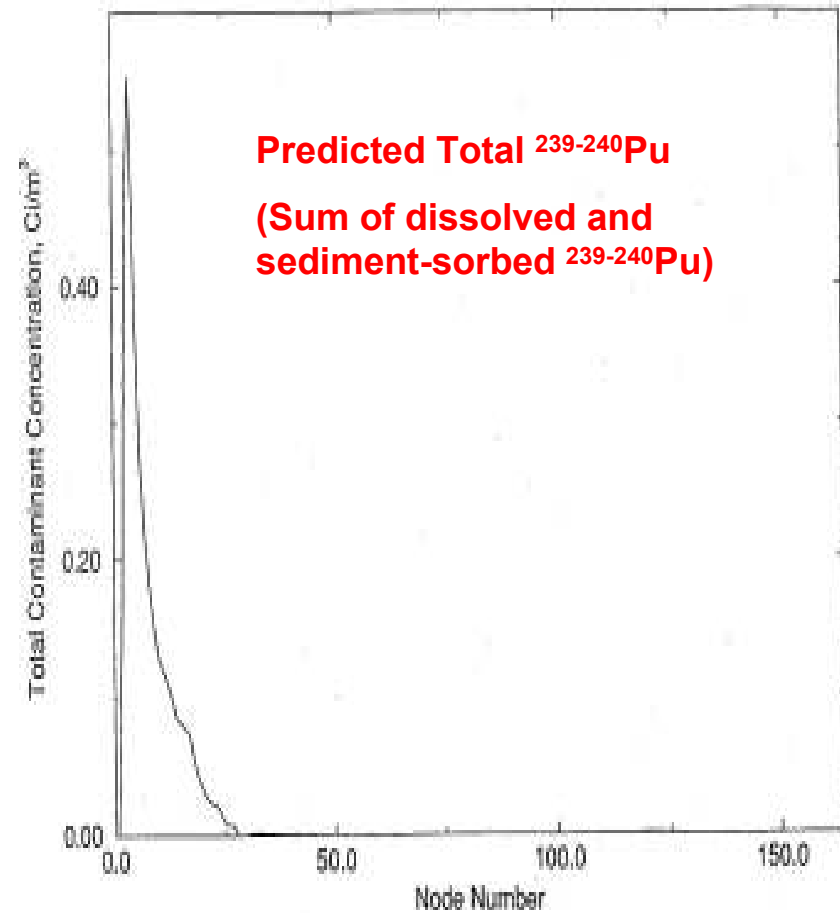
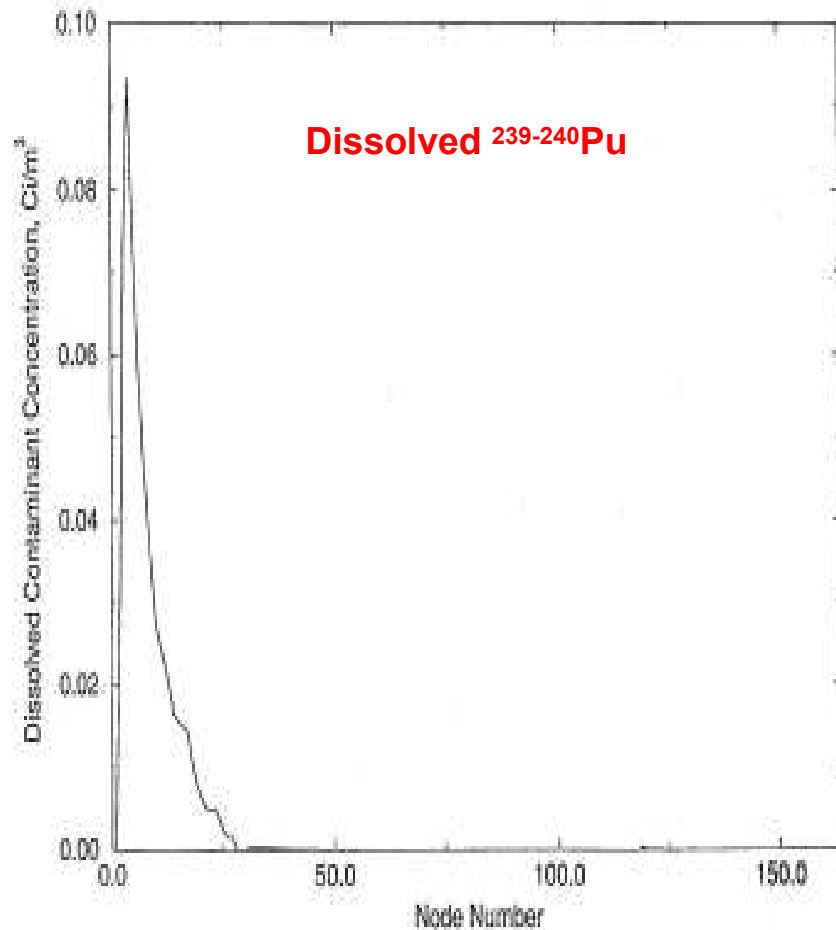
### Advices to Fukushima Farmers

- Explosion due to a cooling devise malfunction to overheat storage
- Released amount:
  - ◆ 256m<sup>3</sup> of high-level radioactive waste
  - ◆ 7.4x10<sup>16</sup> Bq (1/3 of Fukushima)
    - <sup>90</sup>Sr: 4. 0x10<sup>15</sup>Bq
    - <sup>137</sup>Cs: 2. 6x10<sup>14</sup>Bq
- Spread like a belt over 1000 km
- Contamination level:
  - ◆ <sup>90</sup>Sr: 1. 5x10<sup>14</sup>Bq/m<sup>2</sup>
  - ◆ Pasture grass: 2. 6x10<sup>7</sup>Bq/kg
  - ◆ **Feed to livestock: 700, 000Bq/kg**  
(7, 000 times the Japanese regulation)



- 10 years later: <sup>90</sup>Sr and <sup>137</sup>Cs stayed within top 10cm of soil
- 25 years later: 80% of radionuclides still within top 10 cm
- 1968: **Agriculture restarted**
- 1980: <sup>90</sup>Sr
  - Milk: 0. 5Bq/kg (Japanese regulation: 50 Bq/kg)
  - **Beef: 0. 07Bq/kg (Japanese regulation :100 Bq.kg)**
- **Biological Half life of milk**  
Initial period: 0. 3~0. 5年
- **After the initial period:**
  - <sup>90</sup>Sr: 20 years
  - <sup>137</sup>Cs: 10 years

# Yasuo Onishi's TODAM Simulation of $^{137}\text{Cs}$ , $^{90}\text{Sr}$ and $^{239-240}\text{Pu}$ in the Ob-Irtysh-Tobal-Iset-Techa Rivers from Mayak Site to the Kara Sea in Russia: Predicted $^{239-240}\text{Pu}$ Concentrations



# TODAM Predicted Sediment Change and $^{239-240}\text{Pu}$ in the Ob-Irtysh-Tobal-Iset-Techa River Bed

