



Science and Policy: Bangkok Treaty From a Scientific Point of View

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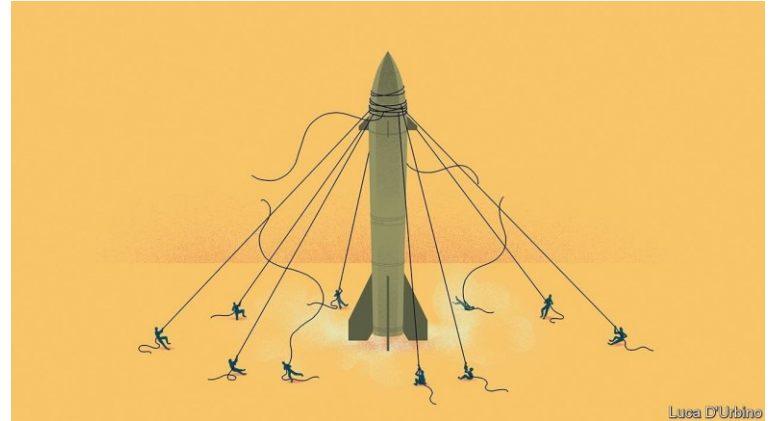


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To keep a relevant and effective policy, involvement of science and technology in nuclear arms control is important.

This study will evaluate the Bangkok Treaty in regards of the nuclear explosion effect.

Our study aims to influence decision-makers in determining a strong policies regarding nuclear testing.



Luca D'Urbino

THE BANGKOK TREATY


Came into force on 27 March 1997 and accepted by ASEAN full ten members.

Relevant information from **the Bangkok Treaty**:

Article 1.a. " ... **"Zone"** refers to **area of all States in Southeast Asia, ... , and their respective continental shelves and Exclusive Economic Zones (EEZ).**"

Article 2.1. "This Treaty and its Protocol shall **apply to the territories, continental shelves, and EEZ of the States Parties within the Zone** in which this Treaty is in force."

Article 3.2.c. "**Each State Party also undertakes not to allow, in its territory, any other State to: test or use nuclear weapons.**"



The Bangkok treaty has not considered the odds of non-ASEAN members conducting nuclear weapon tests outside the EEZ.

NUCLEAR EXPLOSION



The nuclear explosion releases a significant amount of radionuclide high into the atmosphere.

While nuclear explosion blast and the shockwave are deadly, its fallout has a long-term and more far-reaching consequences.

OBJECTIVE

Analyze radionuclide concentration, radiation level and its effect post nuclear explosion outside the "Zone" mentioned in the Bangkok Treaty

Nuclear weapons used:

W76 nuclear warhead is used as a reference with 100 kilotons of TNT equivalent.

Atmospheric particle motion simulation method



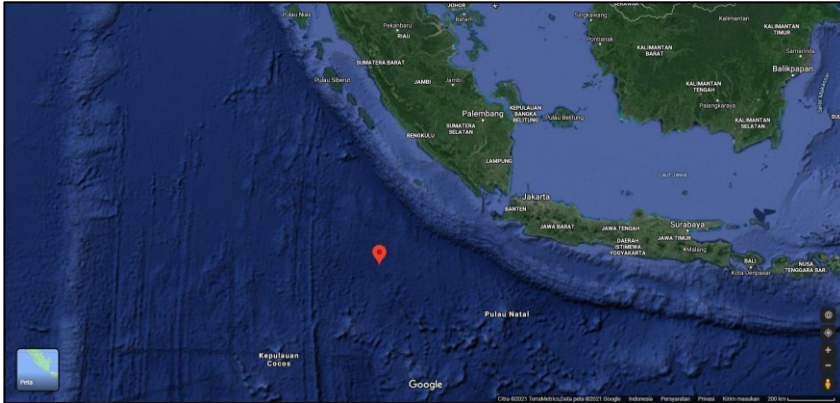
HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model is a complete system for computing trajectories complex dispersion and deposition simulations using either puff or particle approaches.

Simulation Parameters

Parameters	Value	Units
Starting Time	2-May-2021	
Duration	196	hours
End	10-May-2021	
Initial Position	-8.51/100.75	Lat/Lon
Starting Height	9000	M
Radionuclide	Cs-137/I-131/Sr-90	
Meteorological Data	NCEP/NCAR Reanalysis	
Yield	100	kT of TNT

Factors of Consideration:
 High fission product yield
 Long half-life
 Gamma emitting isotope
 Gaseous phase

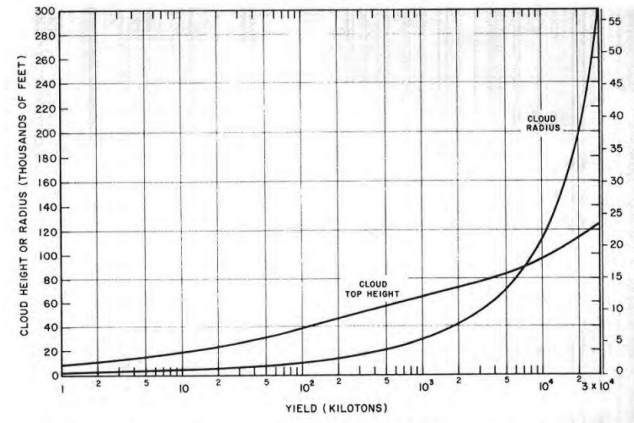
Nuclear detonation site:



-8.52 lat & 100.75 lon

02/05/2021 – 10/05/2021

Plume height consideration:



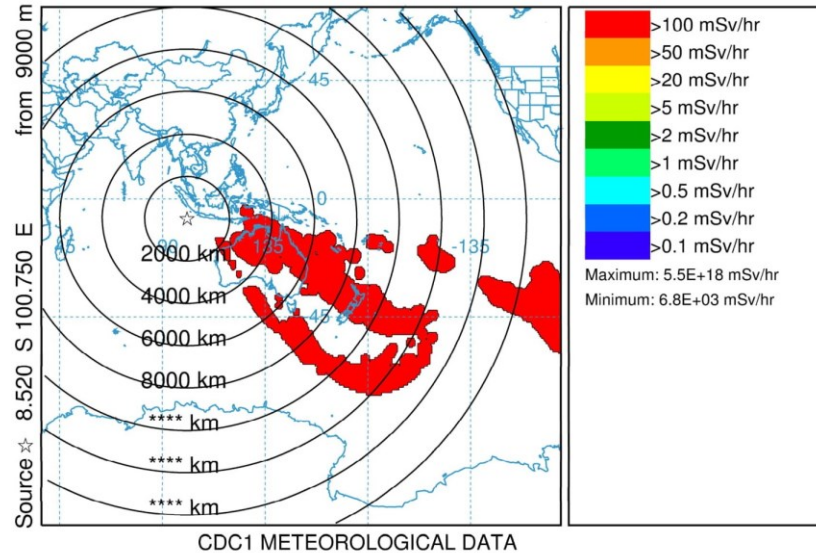
9000 m-AGL

SIMULATION RESULTS

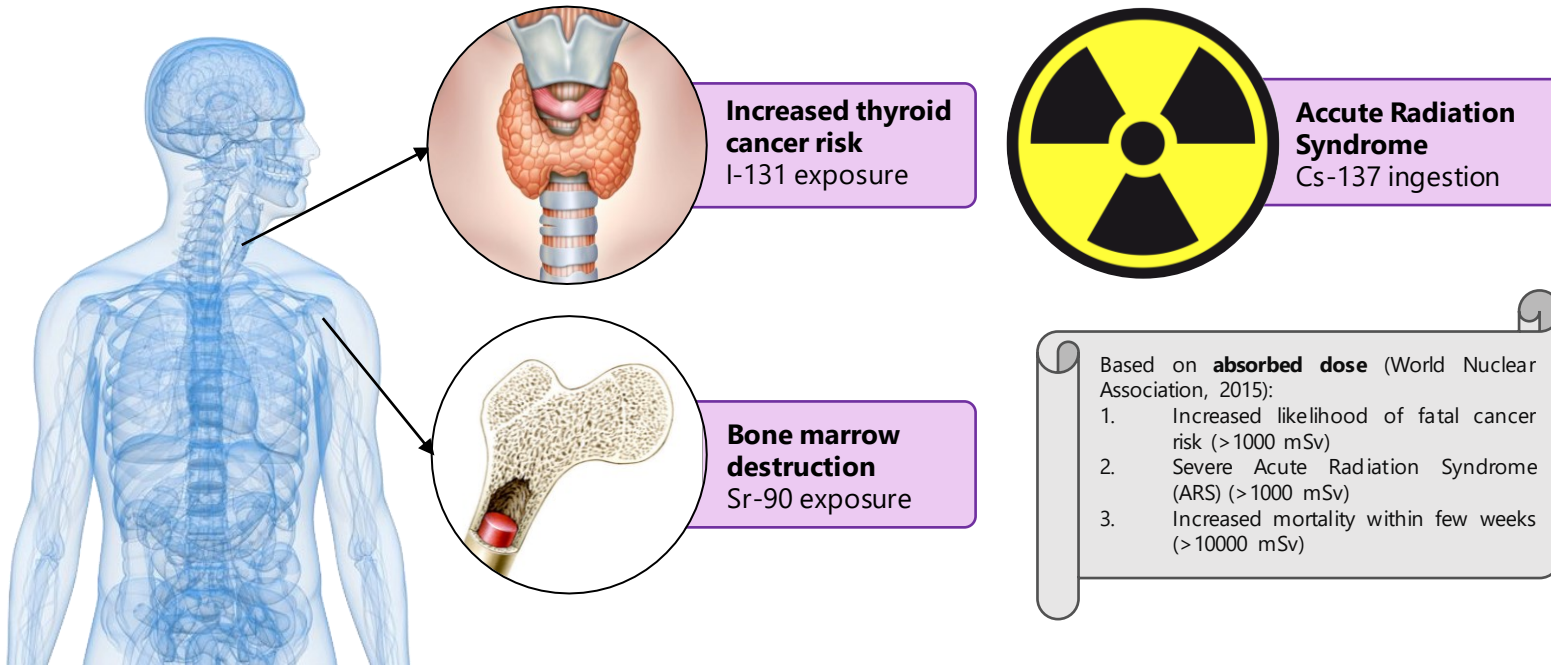
The method used in this research:

- Radionuclide concentration can be mapped with the respect of time
- Dose calculation at ground level can be calculated from the concentration

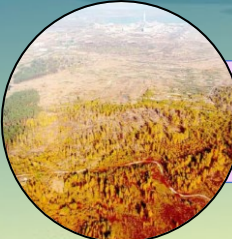
%0: Radiological Dose ###
Dose Rate (mSv/hr) at ground-level
Integrated from 0000 09 May to 0000 10 May 21 (UTC)
SUM Release started at 0000 02 May 21 (UTC)




Excessive Radiation Exposure Effect on Human




Excessive Radiation Exposure Effect on Animals and Plants



Red Forest, an example of radiation effects on trees, radiation causes mass mortality in the population



Radiation causes white spots to appear on cow's body



One is exposed to radiation, and the other is not, it shows noticeable difference on hair color

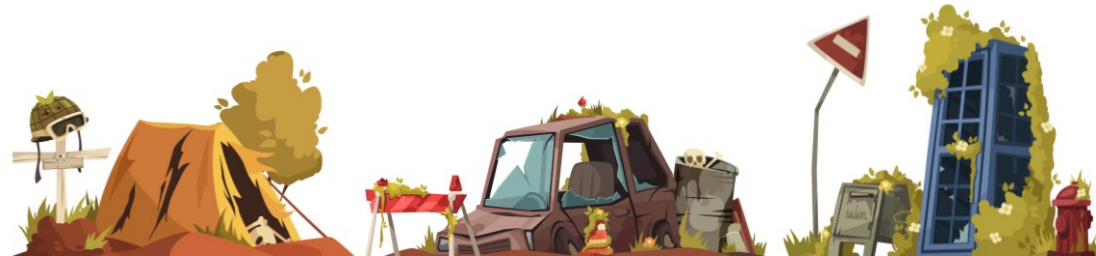
According to ICRP Publication 108:

1. Reduced egg counts and population density on some insects
2. Reduced pollen quality and quantity
3. Reduced overall reproduction capability on some trees
4. Increased risk of sterilization and mortality on some mammals

Leaders are encouraged to come together and revisit the Bangkok Treaty particularly on its safety aspect.

The detonation of 100 kilotons of TNT equivalent nuclear bomb outside the indicated "Zone" results in the deposition of high concentration fission products (Cs-137, I-131, and Sr-90) on the shoreline of several neighboring countries.

“ Let’s decide the future of Nuclear Weapons ”
before they decide ours



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