

Vietnam Atomic Energy Institute



4th ASEAN Nuclear Power Safety Research Annual Meeting

What if a nuclear accident happened today?

Dr. Pham Kim Long

Hanoi, 2 June 2021

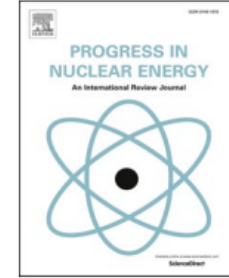


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Progress in Nuclear Energy

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Inter-comparison of transboundary atmospheric dispersion calculations: A summary of outputs from the ASEAN NPSR benchmark exercise

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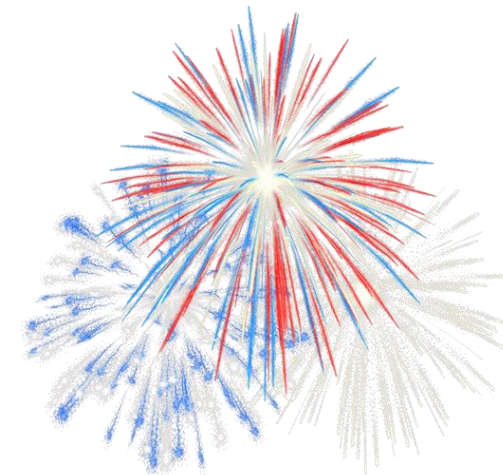
^d Nuclear Research and Development Division, Thailand Institute of Nuclear Technology (Public Organization) 16 Vibhavadi-Rangsit Road, Lat Yao, Chatuchak, Bangkok, 10900, Thailand

^e Singapore Nuclear Research and Safety Initiative, 1 CREATE Way #04-01 CREATE Tower, 138602, Singapore

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^g Centre for Radiation, Chemical and Environmental Hazards, Public Health England, Chilton, Didcot, OX11 0RQ, United Kingdom

^h DSO National Laboratories, 12 Science Park Dr, 118225, Singapore



Assessment of atmospheric dispersion and radiological impact from a nuclear accident



Nuclear Accident



Chernobyl
1986



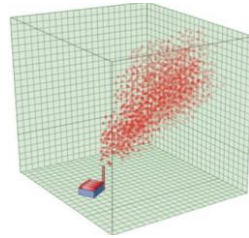
Fukushima Daiichi
2011



What if a nuclear accident happened today?

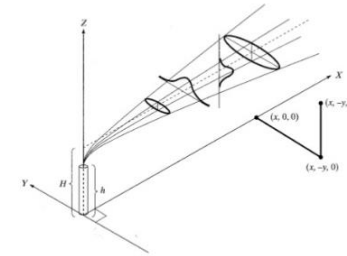
Atmospheric Dispersion Model

Lagrangian model



FLEXPART
LASAT (JRodos)
NAME3 (PACE)

Gaussian model



ARGOS
RIMPUFF (JRodos)

Meteorological Data

Reanalysis models

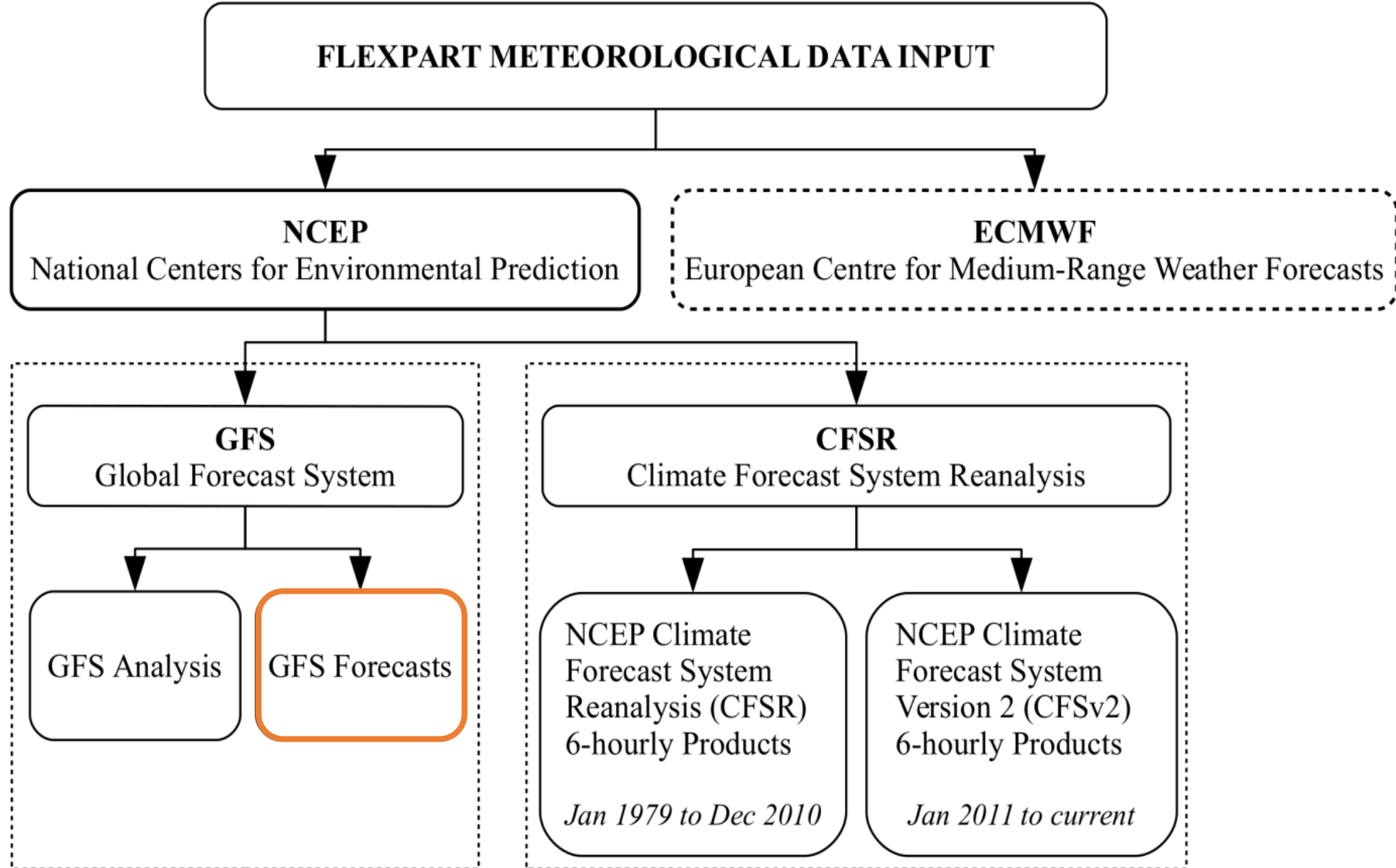
Analysis models

Forecast models

ASEAN NPSR benchmark exercise
A hypothetical accident of Fangchenggang NPP

Meteorological data sets used for air dispersion modelling

Type	Model
Climate	CCSM, CESM, CFSv2 , CGCM, ECHAM, GFDL CM2.X, HadCM3, HadGEM1, IGCM, MPAS
Global weather	ARPEGE, FIM, GEM/GDPS, GFS , GME/ICON, IFS (ECMFW), JMA-GSM, NAEFS, NAVGEM, UM
Regional and mesoscale atmospheric	HIRLAM, LAPS, NAM, RAMS, RPM, RR/RAP, WRF
Regional and mesoscale oceanographic	FESOM, FVCOM, HyCOM, MITgcm, MOM, POM, ROMS
Chemical transport	ClAMS, GEOS-Chem, MOZART
Land surface parametrization	CLASS, ISBA, JULES
Discontinued	AVN/MRF/GSM, Eta, LFM, MM5, NGM, NOGAPS, RUC



GFS-ANL

Index of /pub/has/model/HAS011541436

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GFS-FCS

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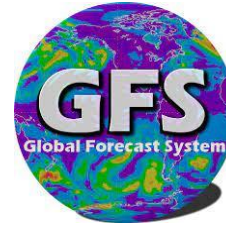
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VINATOM-HPC
High Performance Computing Center



A lagrangian particle dispersion model

+



GFS Forecast model



What if a nuclear accident happened today?

NPP

Fangchenggang & Changjiang

Radionuclides

¹³¹I and ¹³⁷Cs

Meteorological data

GFS-FCS (0.5°x0.5°)

GFS-ANL, CFSv2 (0.5°x0.5°), FNL (1°x1°)

Time of simulation/ Time of release

00h00 20/02/2014 UTC

Latitude/ Longitude

F: 21.67, 108.56 & C: 19.46, 108.89

Total number of particles to be released

1 million particles

Unpublished

Unpublished

Unpublished

Unpublished

Unpublished

Unpublished

4th ASEAN Nuclear Power Safety Research



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