Ukrainian Hydrometeorological Center
State Service on Emergency of Ukraine

Comparison of calculation results performed by the WMO(RSMCs) and RACPC during the ConvEx-3 exercise in 2021

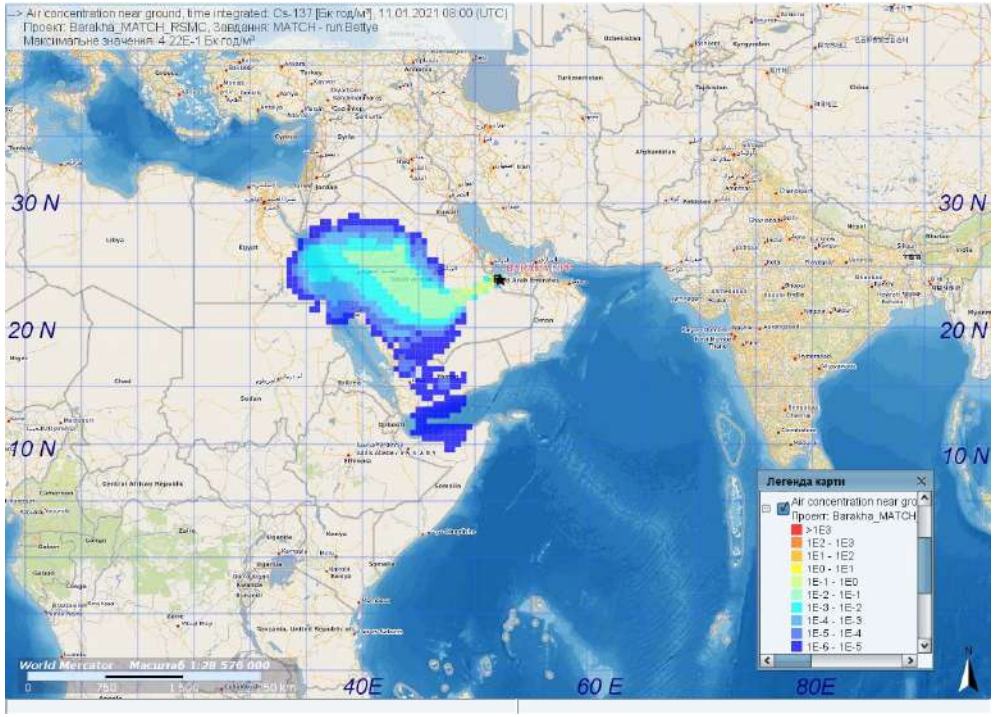
Radiation Accidents Consequences Prediction Center (RACPC)

I. Kokot, L.Tabachnyi

KIT RUG , 25th January 2022

Radiation Accidents Consequences Prediction Center

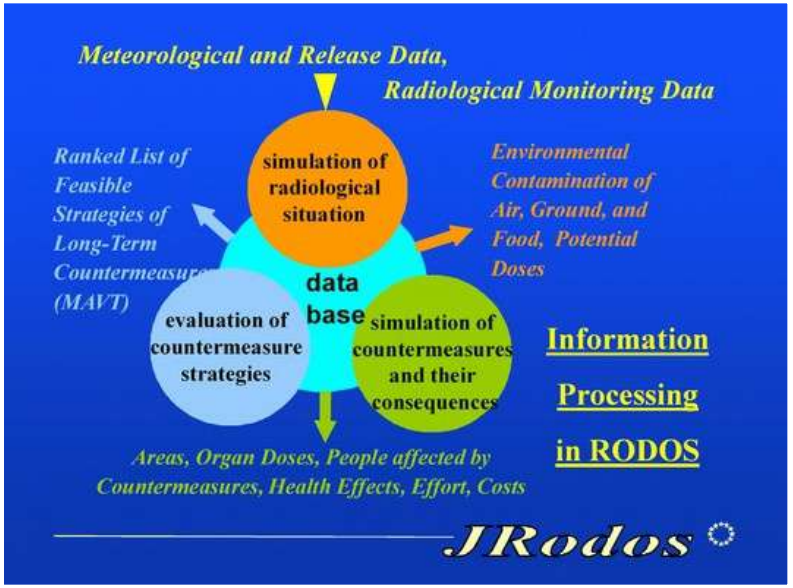
The center was established with the financial and organizational support of the European Commission in 2015.



RACPC acting as a structural unit of Ukrainian Hydrometeorological Center and is an integral part of the Emergency Response System of the State Service on Emergency of Ukraine.

The center operates with JRODOS and is the main information support center for decision-making in cases of Emergency.

The center is in charge to collect, collate, analysis and exchange information on the actual and expected radiation situation on the territory of Ukraine in cooperation with Hydrometeorological institutions.



Input data for simulation

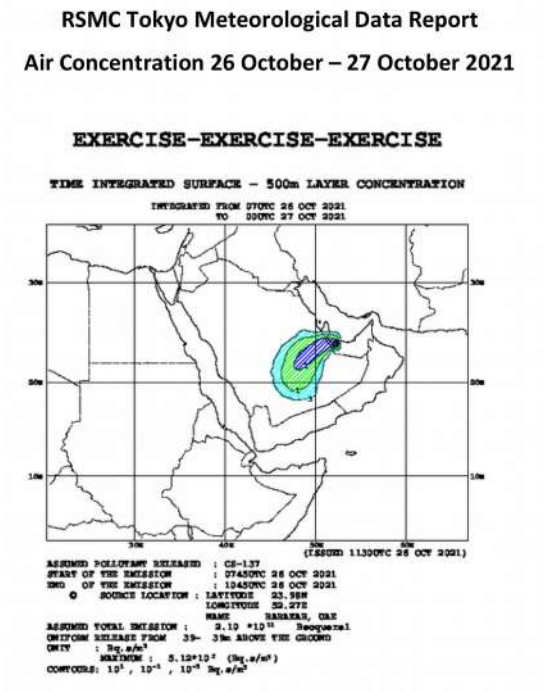
Source location : 52.2317E ; 23.9678 N Unit : Barakha NPP
Start emission : 07:45 (UTC) 26/10/2021 ; End emission: 10:45(UTC)26/10/2021; Duration: 3h
Total emission : 2,1e+11 Bq ; Rate : 1,94444e+07 Bq*s for RSMC Exeter, RMSC Obninsk, RSMC Tokyo
Total emission : 2,15e+11 Bq ; Rate : 1,99+07 Bq*s for RACPC
Rate : 0,7+07 Bq*h for RSMC BeiJing
Height : 39 m agl ; Pollutant: Caesium-137
Meteo for the exercise: historical meteorological conditions (8 and 9 January 2021)

Table of comparisons

Calculation performed by	Dispersion model	Meteo	Air Concentration near ground Cs-137 [Bq*s/м3].					
			24h Time integrated		*24h Time integrated after the first day of the emergency*		*24h Time integrated after the second day of the emergency*	
			Maximum value	*Location of max value*	*Maximum value*	*Location of max value*	*Maximum value*	*Location of max value*
RACPC	MATCH	NOMADS	1,52E+03	52,07E; 24,0N	2,13E+02	46,44E; 21,9N	1,00E+02	40,5E; 25,5N
RSMC Exeter	NAME	Met Office	3,70E+02	52,0E; 24,0N	1,57E+02	46,8E; 21,1N	4,42E+01	41,0E; 25,0N
RSMC Obninsk	Obninsk	OMD	1,70E+03	not specified	8,50E+01	not specified	1,70E+01	not specified
RSMC Tokyo	GTTM	JMA	5,12E+02	not specified	9,64E+00	not specified	1,94E+00	not specified
RSMC BeiJing	HYSPLIT(?)	GRAG Meteorological data	2,10E+07	51,0E; 24,0N	1,20E+07	49,0E; 21,0N	1,30E+06	46,0E; 20,0N

Calculation performed by	Dispersion model	Meteo	Total Depositions at ground level Cs-137 [Bq/м2].					
			24h Time integrated		*48h Time integrated*		*72h Time integrated*	
			Maximum value	*Location of max value*	*Maximum value*	*Location of max value*	*Maximum value*	*Location of max value*
RACPC	MATCH	NOMADS	1,31E+00	50,96E ; 23,53N	1,73E+00	42,01E ; 25,45N	1,83e+00	41.97E ; 25,53N
RSMC Exeter	NAME	Met Office	1,32E-01	50,5E ; 23,5N	3,03E-01	42,5E ; 22,0N	7,47E-01	41.5 E ; 25,8N
RSMC Obninsk	Obninsk	OMD	1,1e+01	not specified	1,1e+01	not specified	1,1e+01	not specified
RSMC Tokyo	GTTM	JMA	2,52E+01	not specified	2,52E+01	not specified	2,52E+01	not specified
RSMC BeiJing	HYSPLIT(?)	GRAG Meteorological data	not specified	not specified	not specified	not specified	2,50E+05	51,0E; 24,0N

Air Concentration 24h time integrated. Valid from 00:00 26/10/21 to 08:00 27/10/21


RSMC Tokyo Meteorological Data Report

Air Concentration 26 October – 27 October 2021

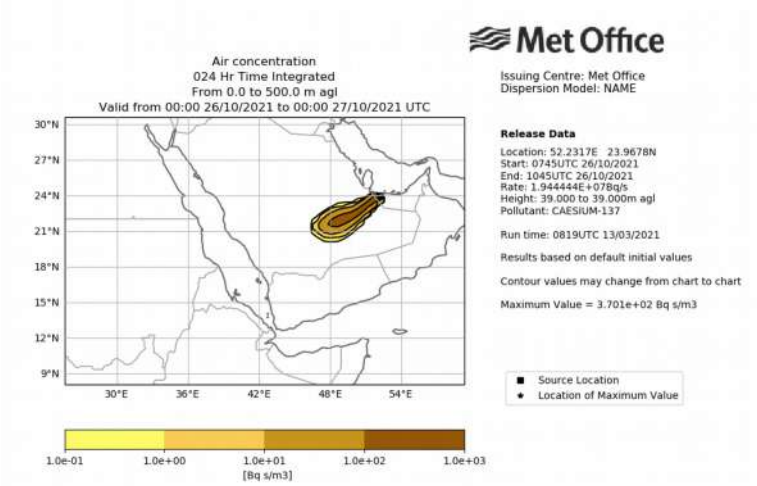
EXERCISE-EXERCISE-EXERCISE

TIME INTEGRATED SURFACE – 500m LAYER CONCENTRATION

Maximum value

[Bq*s/m3]

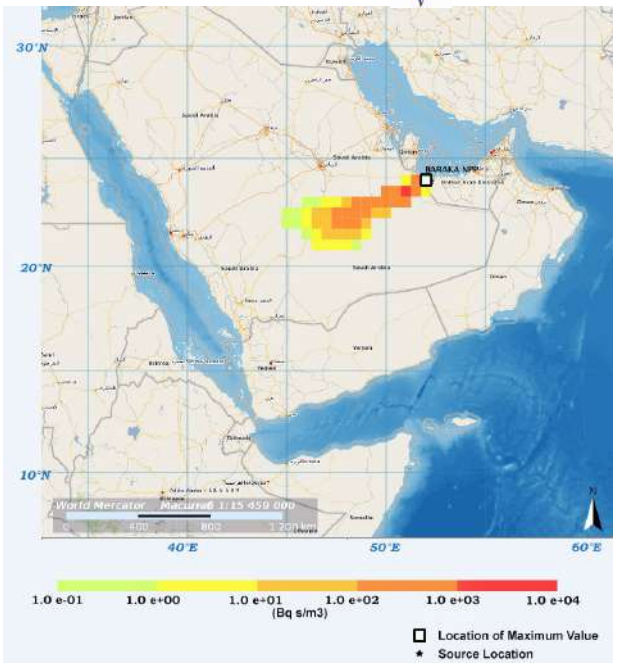
RACPC - 1,52 e+03
RSMC Exeter – 3.7 e+02
RSMC Tokyo- 5,2 e+02
RSMC Obninsk-1,7 e+03

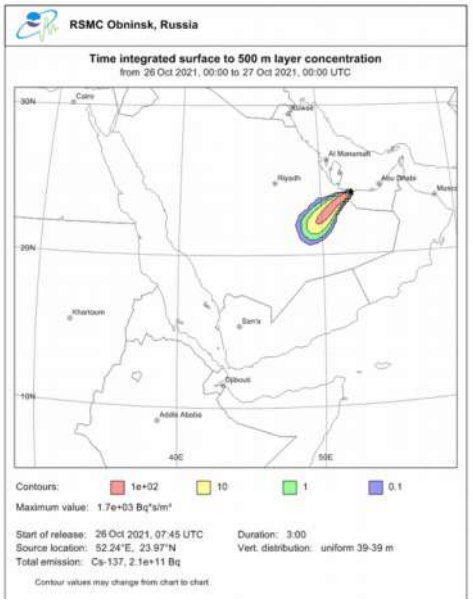


Location of Max value

RACPC - 52,07E; 24,0N
RSMC Exeter - 52,0E; 24,0N
RSMC Tokyo- not specified
Rsmc Obninsk-not specified

RACPC UHMC



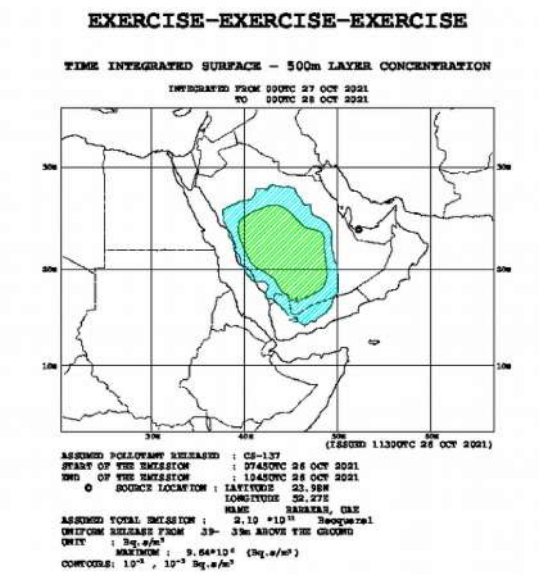


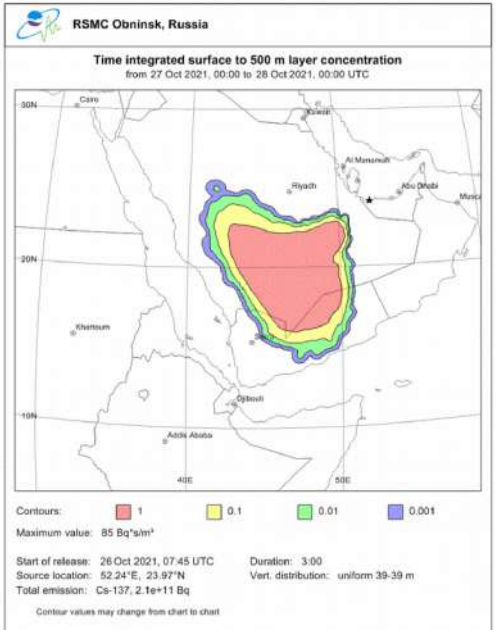
Contour of minimum value for visualization

RACPC - 1,0 e-01
RSMC Exeter - 1,0 e-01
RSMC Tokyo- 1,0 e-03
Rsmc Obninsk- 1,0 e-01

Air Concentration 24h time integrated. Valid from 08:00 27/10/21 to 08:00 28/10/21

RSMC Tokyo Meteorological Data Report
Air Concentration 27oktober-28 oktober 2021





Maximum value [Bq*s/m3]

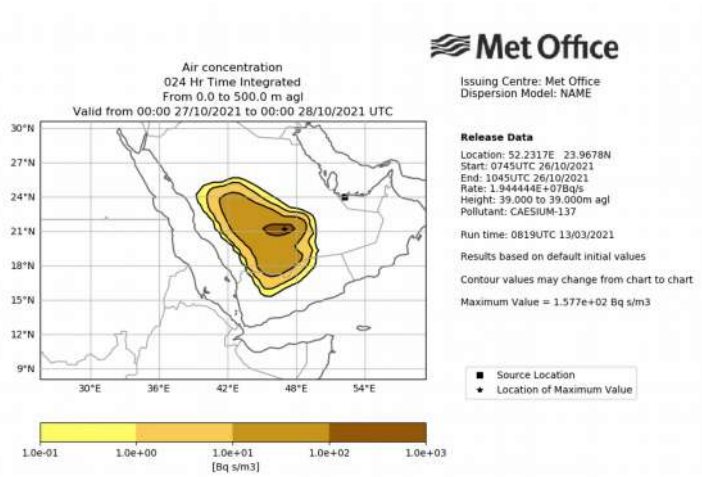
RACPC - 2,13 e+02
RSMC Exeter – 1.57 e+02
RSMC Tokyo- 9,64E+00
RSMC Obninsk-8,50E+01

Location of Max value

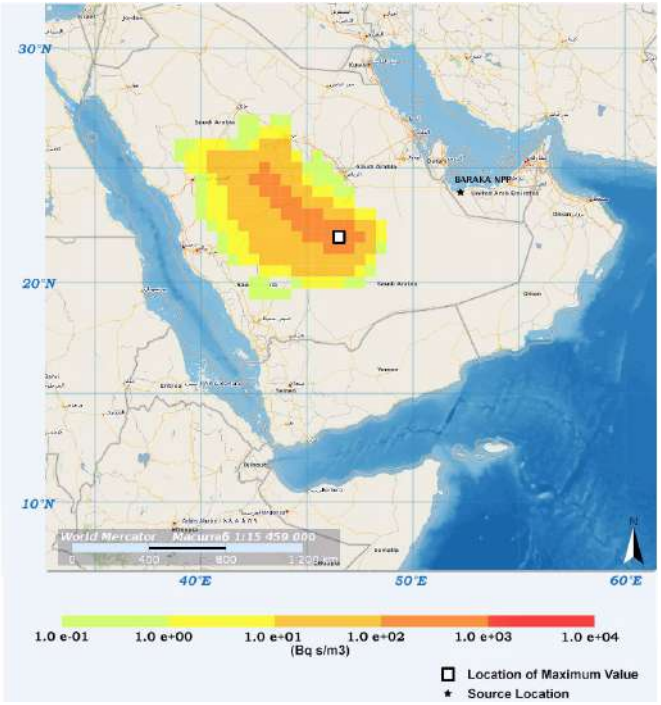
RACPC - 46,44E; 21,9N
RSMC Exeter - 46,8E; 21,1N
RSMC Tokyo- not specified
Rsmc Obninsk-not specified

Contour of minimum value for visualization

RACPC - 1,0 e-01
RSMC Exeter - 1,0 e-01
RSMC Tokyo- 1,0 e-03
Rsmc Obninsk- 1,0 e-03

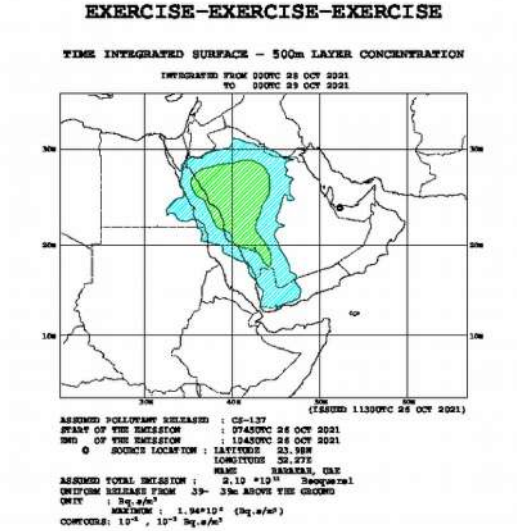


RACPC UHMC



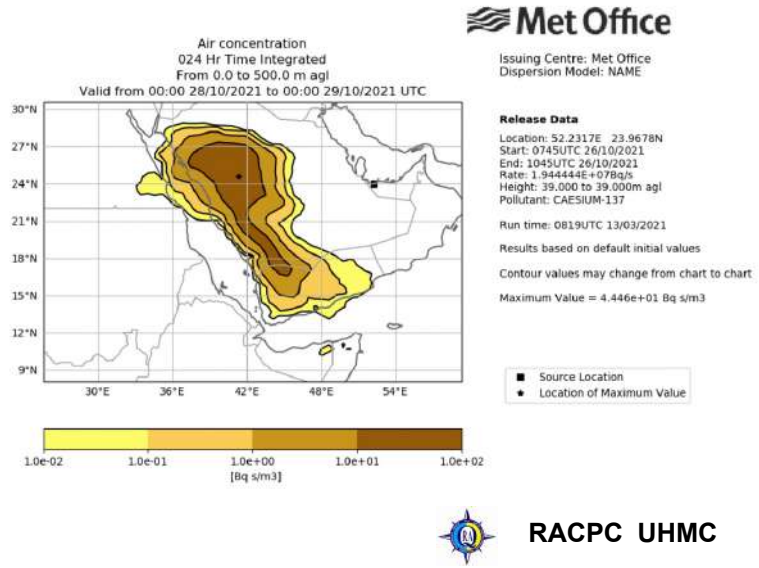
Air Concentration 24h time integrated. Valid from 08:00 28/10/21 to 08:00 29/10/21

RSMC Tokyo Meteorological Data Report
Air Concentration 28oktober-29 oktober 2021

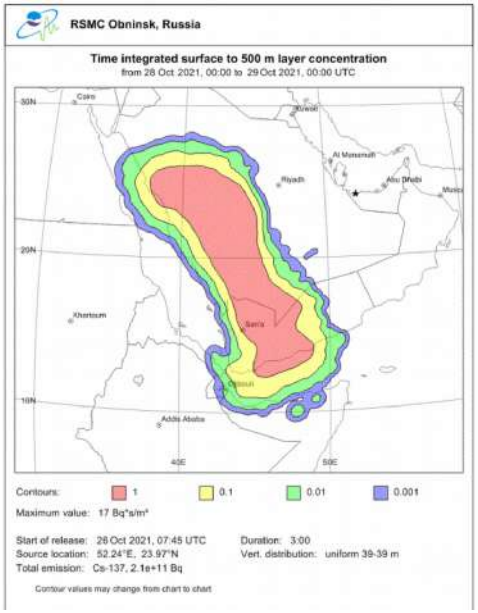


Maximum value [Bq*s/m3]

RACPC - 1,00 e+02
RSMC Exeter – 4.42 e+01
RSMC Tokyo- 1,94 e+00
RSMC Obninsk-1,7 e+01

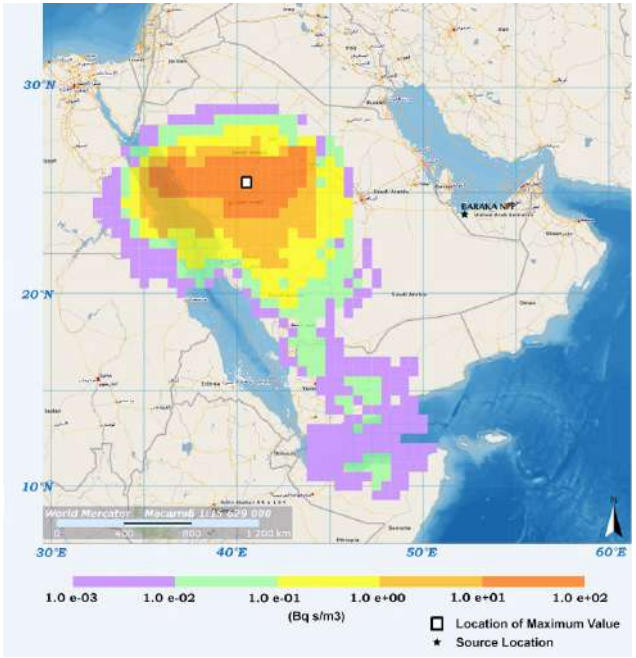


RACPC UHMC



Location of Max value

RACPC - 40,5E; 25,5N
RSMC Exeter - 41,0E; 25,0N
RSMC Tokyo- not specified
Rsmc Obninsk-not specified

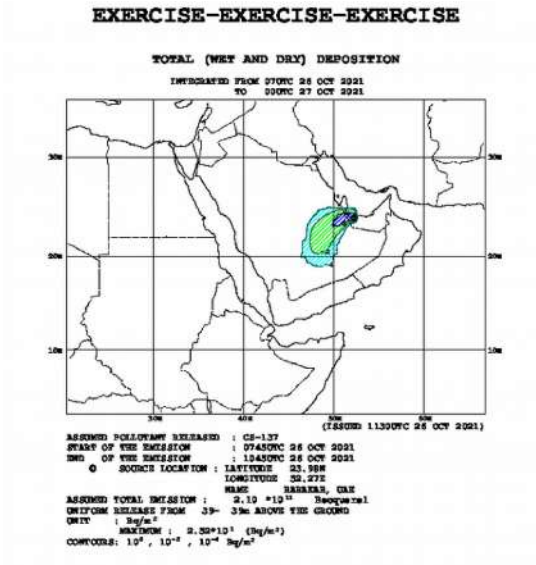


Contour of minimum value for visualization

RACPC - 1,0 e-03
RSMC Exeter - 1,0 e-02
RSMC Tokyo- 1,0 e-03
Rsmc Obninsk- 1,0 e-03

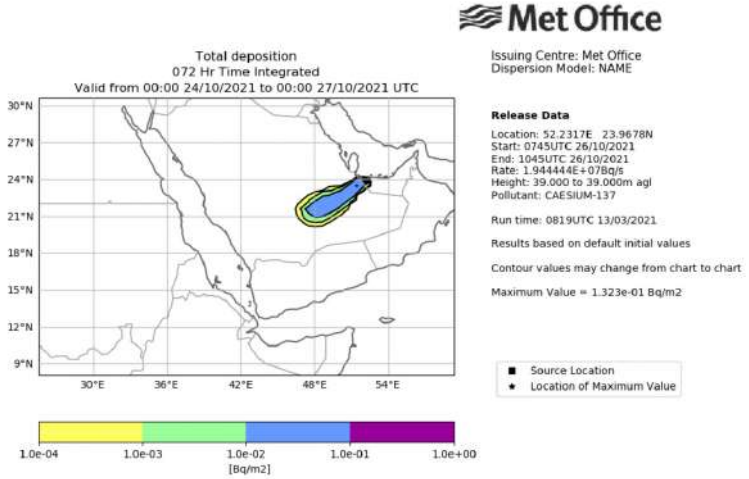
Total deposition 24h time integrated. Valid from 08:00 26/10/21 to 08:00 27/10/21

RSMC Tokyo Meteorological Data Report
Total Deposition 26oktober-27 oktober 2021



Maximum value [Bq/m2]

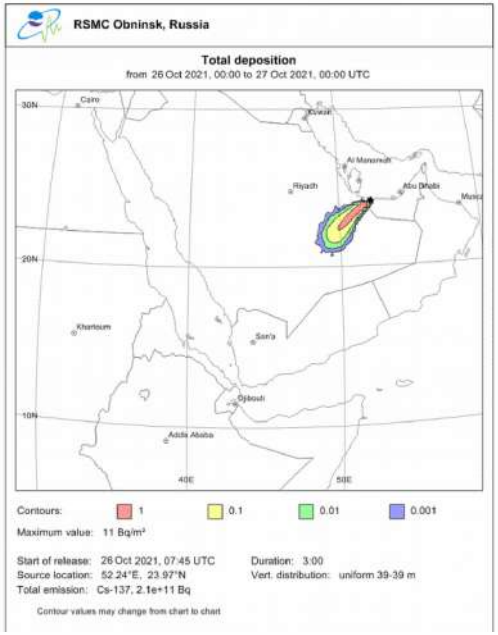
RACPC - 1,31 e+00
RSMC Exeter – 1.323 e-01
RSMC Tokyo- 2,52E+01
RSMC Obninsk-1,1e+01



RACPC UHMC

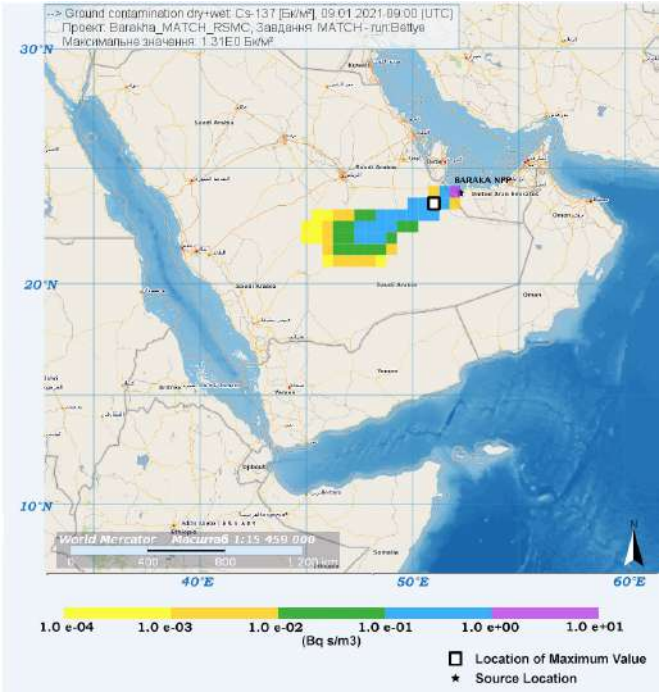
Location of Max value

RACPC - 50,96E ; 23,53N
RSMC Exeter -50,5E ; 23,5N
RSMC Tokyo- not specified
Rsmc Obninsk-not specified



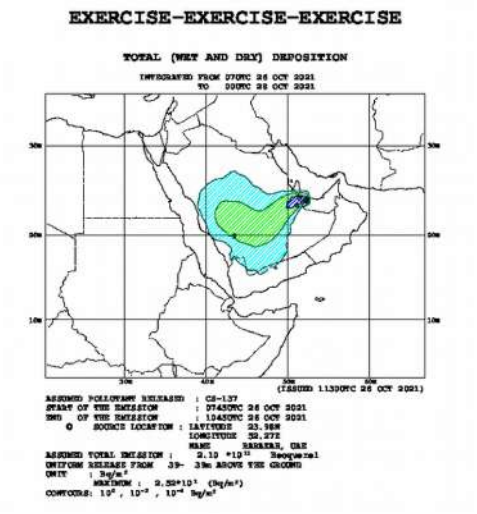
Contour of minimum value for visualization

RACPC - 1,0 e-04
RSMC Exeter - 1,0 e-04
RSMC Tokyo- 1,0 e-04
Rsmc Obninsk- 1,0 e-03



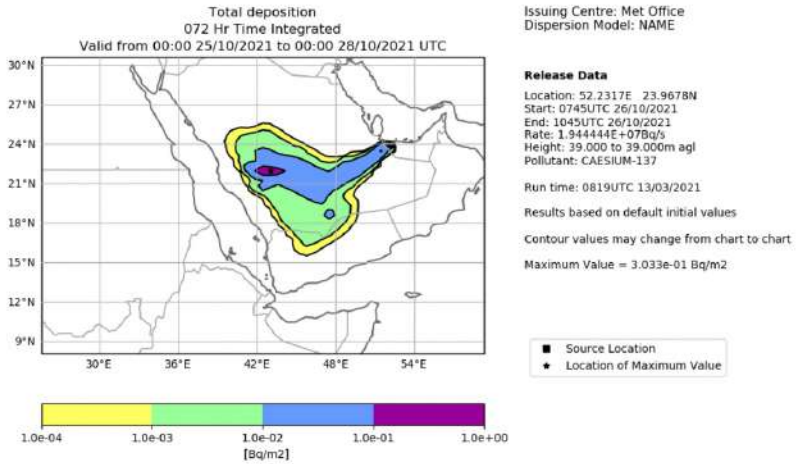
Total deposition 48h time integrated. Valid from 08:00 26/10/21 to 08:00 28/10/21

RSMC Tokyo Meteorological Data Report
Total Deposition 26oktober-28 oktober 2021

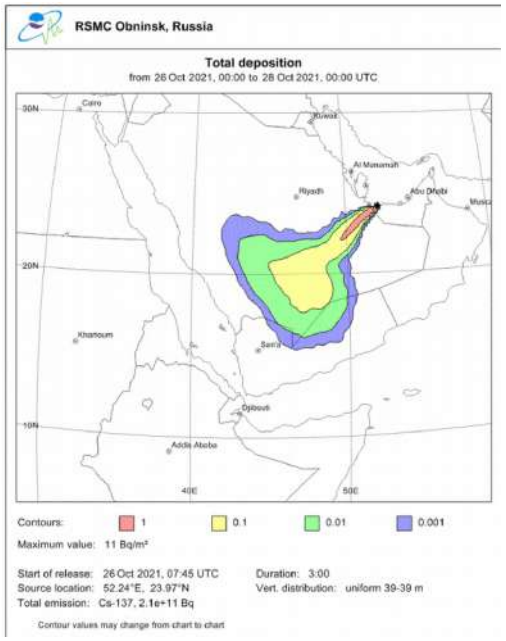


Maximum value [Bq/m2]

RACPC - 1,73 e+00
RSMC Exeter – 3.033 e-01
RSMC Tokyo- 2,52E+01
RSMC Obninsk-1,1e+01



RACPC UHMC

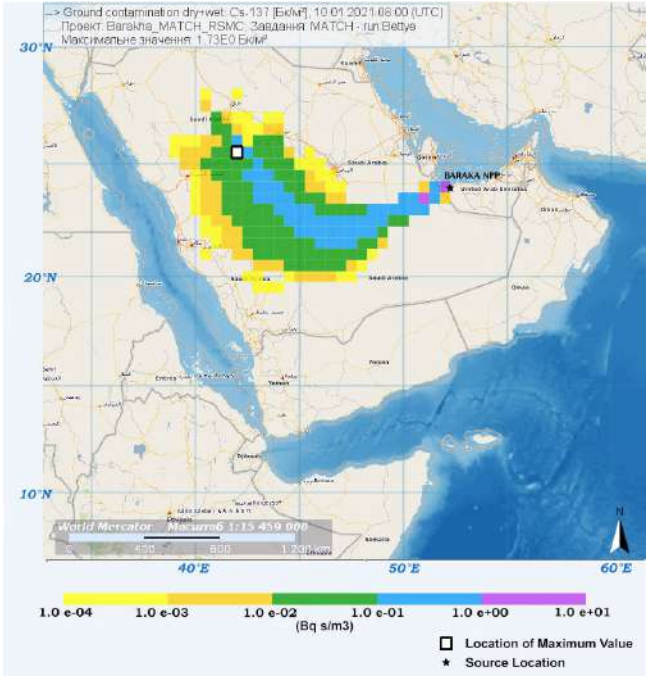


Location of Max value

RACPC - 50,96E ; 23,53N
RSMC Exeter -50,5E ; 23,5N
RSMC Tokyo- not specified
Rsmc Obninsk-not specified

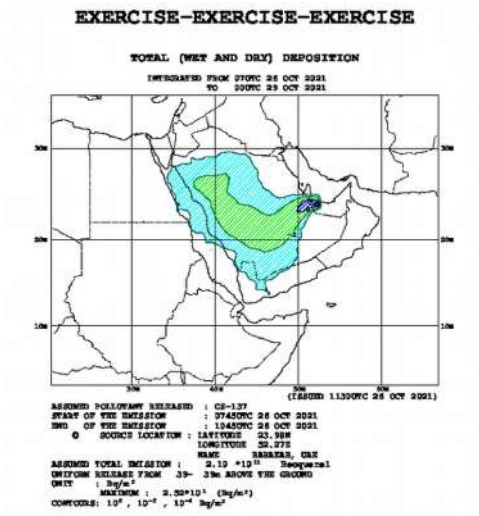
Contour of minimum value for visualization

RACPC - 1,0 e-04
RSMC Exeter - 1,0 e-04
RSMC Tokyo- 1,0 e-04
Rsmc Obninsk- 1,0 e-03



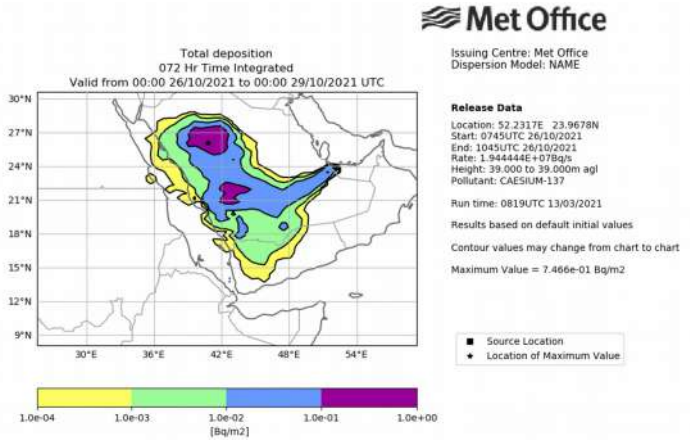
Total deposition 72h time integrated. Valid from 08:00 26/10/21 to 08:00 29/10/21

RSMC Tokyo Meteorological Data Report
Total Deposition 26oktober-29 oktober 2021

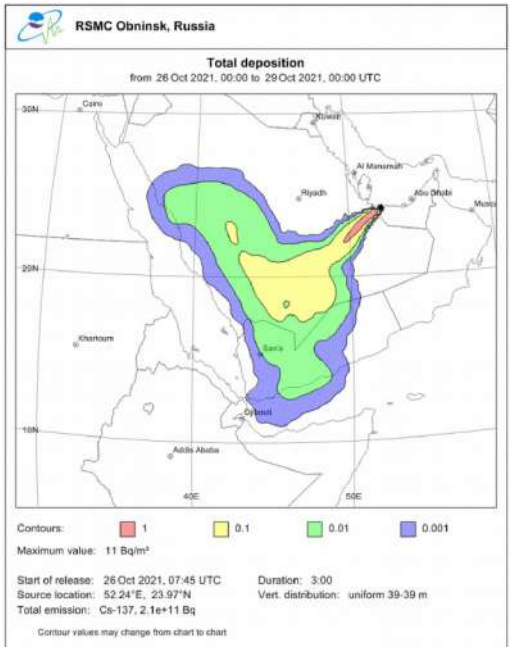


Maximum value [Bq/m2]

RACPC - 1,83e+00
RSMC Exeter – 7,47E-01
RSMC Tokyo- 2,52E+01
RSMC Obninsk-1,1e+01



RACPC UHMC

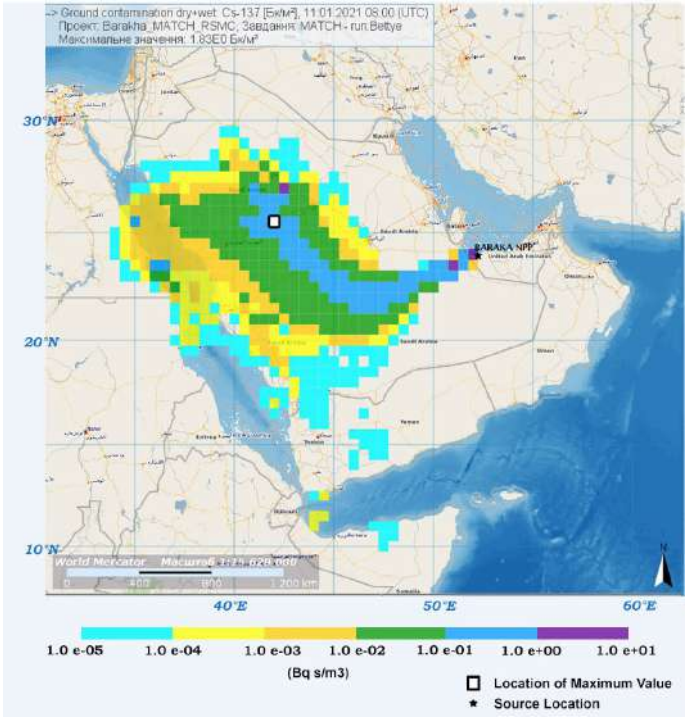


Location of Max value

RACPC - 41.97E ; 25,53N
RSMC Exeter - 41.5 E ; 25,8N
RSMC Tokyo- not specified
Rsmc Obninsk-not specified

Contour of minimum value for visualization

RACPC - 1,0 e-05
RSMC Exeter - 1,0 e-04
RSMC Tokyo- 1,0 e-04
Rsmc Obninsk- 1,0 e-03

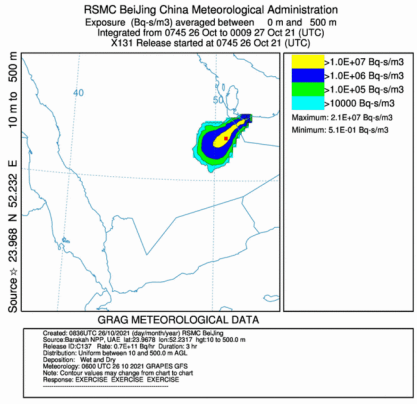


Result of simulation performed by RSMC BeiJing

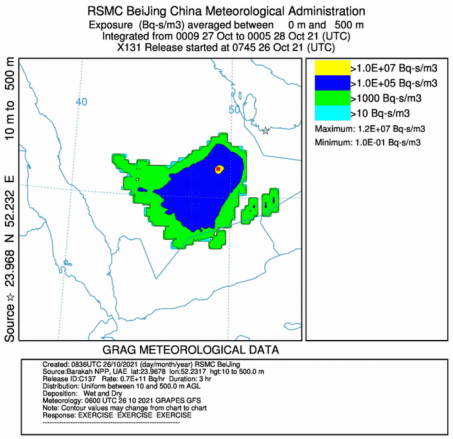
ConvEx-3 (2021) – Barakah NPP (UAE) (EXERCISE)

RSMC Beijing Meteorological Data Report

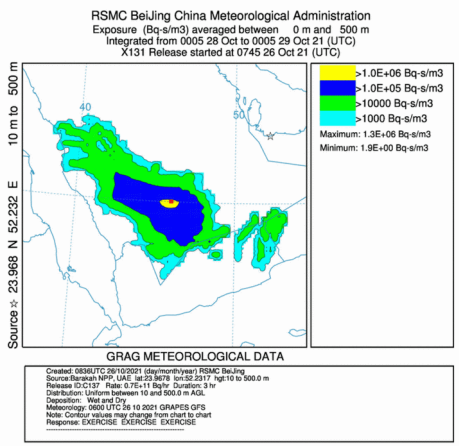
Air Concentration 26 October – 27 October 2021



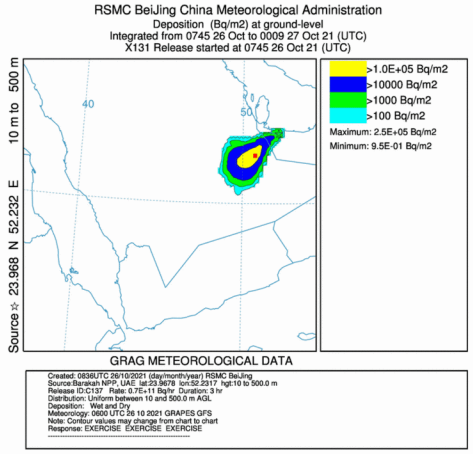
Air Concentration 27 October – 28 October 2021



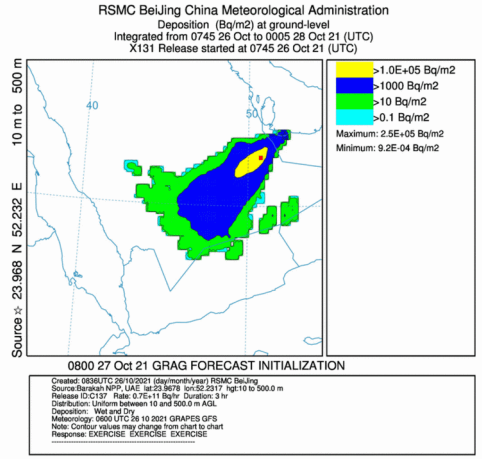
Air Concentration 28 October – 29 October 2021



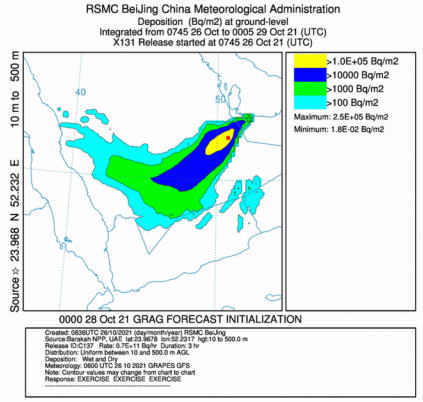
Total Deposition 26 October – 27 October 2021



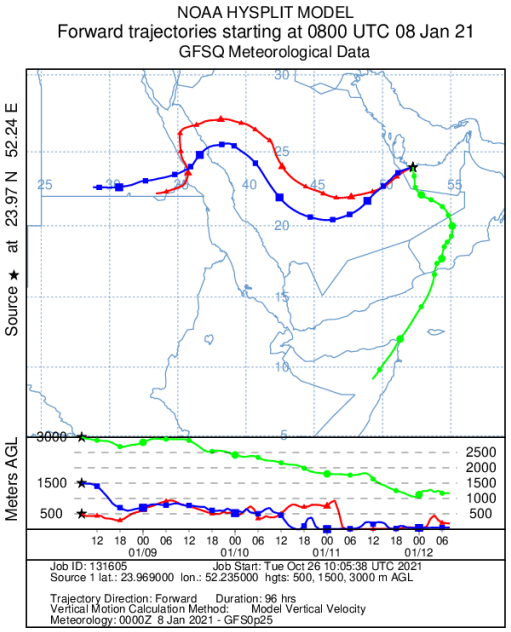
Total Deposition 27 October – 28 October 2021



Total Deposition 28 October – 29 October 2021

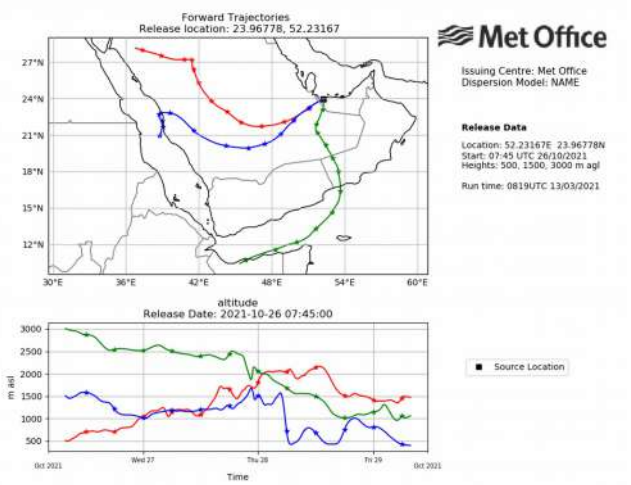


Forward trajectories at 08:00 UTC 26/10/2021 performed by RSMC and RACPC

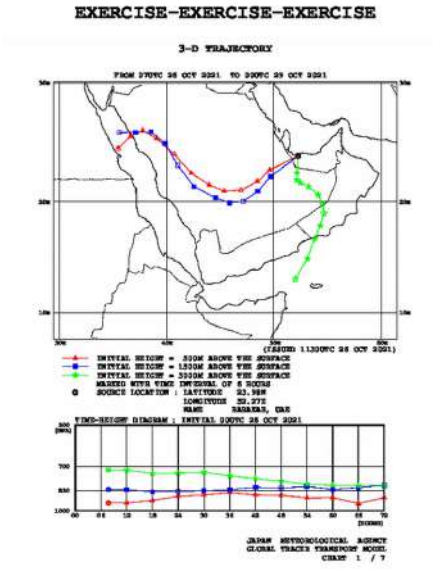


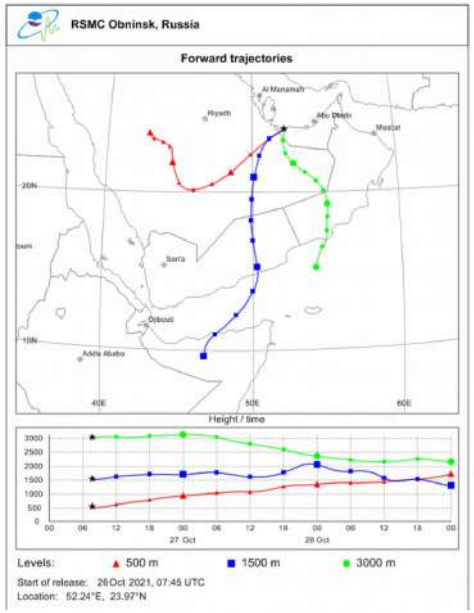
RACPC UHMC

Performed with using HYSPLIT model
https://www.ready.noaa.gov/hypub-bin/trajtype.pl

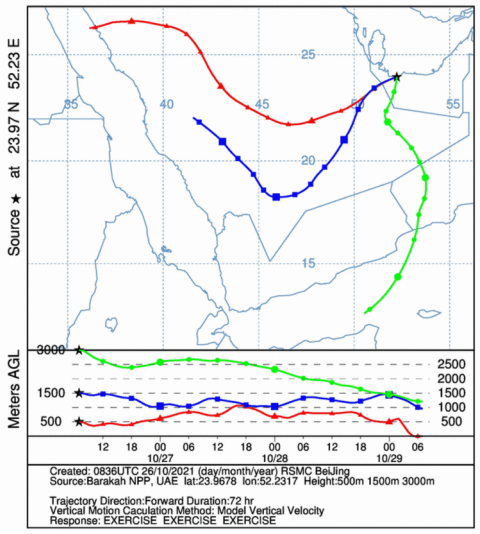


RSMC Tokyo Meteorological Data Report
Forward trajectories at 08:00 UTC 26/10/21

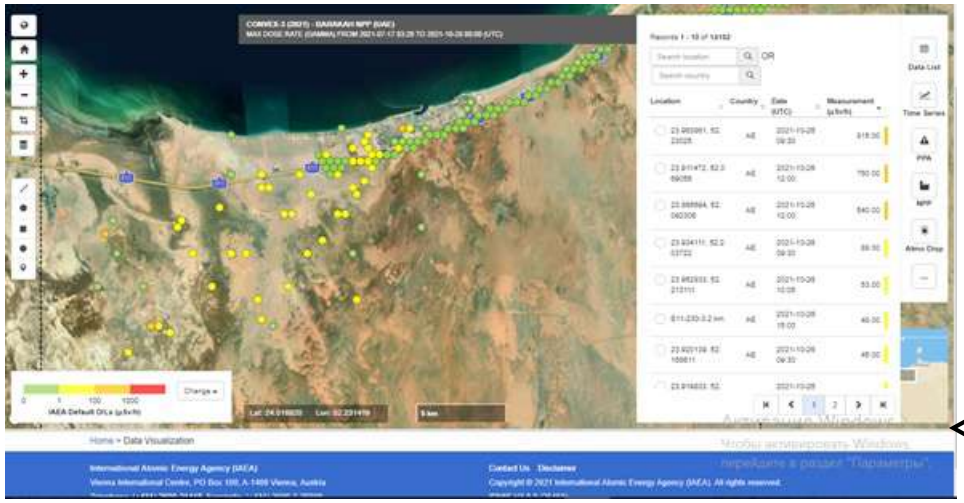




Forward Trajectories 26 October 2021

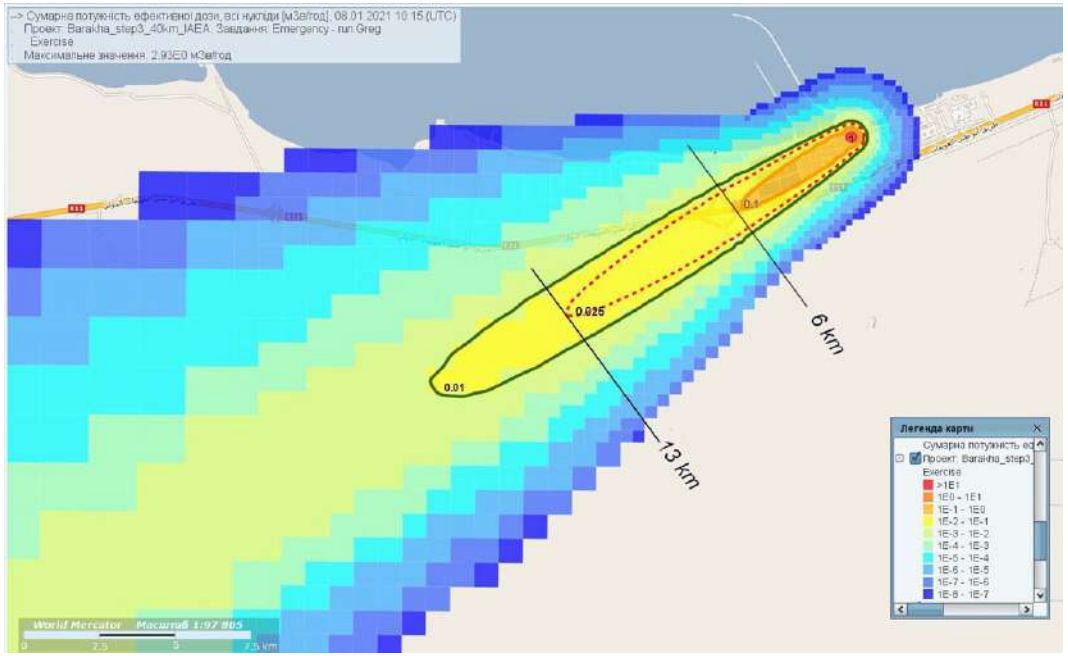


ConvEx3 October 2021 Barakah NPP UAE



Gamma Dose Rate Emergency area Published by UAE during training in IRMIS

Gamma Dose Rate Emergency area Simulation result Performed with JRodos



Ukrainian Hydrometeorological Center
State Service on Emergency of Ukraine

Thank you for listening

For further information, please contact us
ceprac@meteo.gov.ua