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Role of SSTC NRS in response to the wildfires in Chernobyl Exclusion Zone

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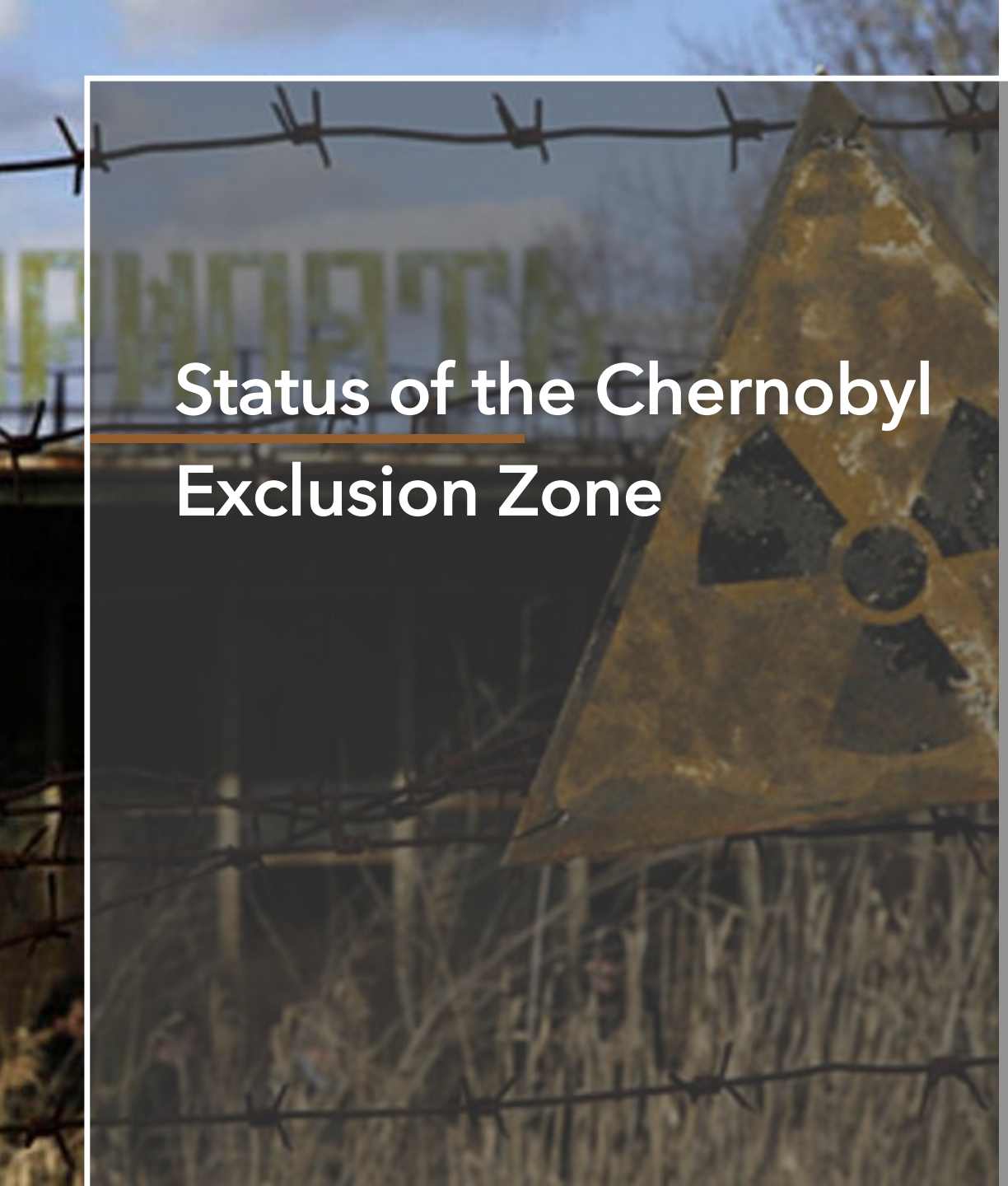
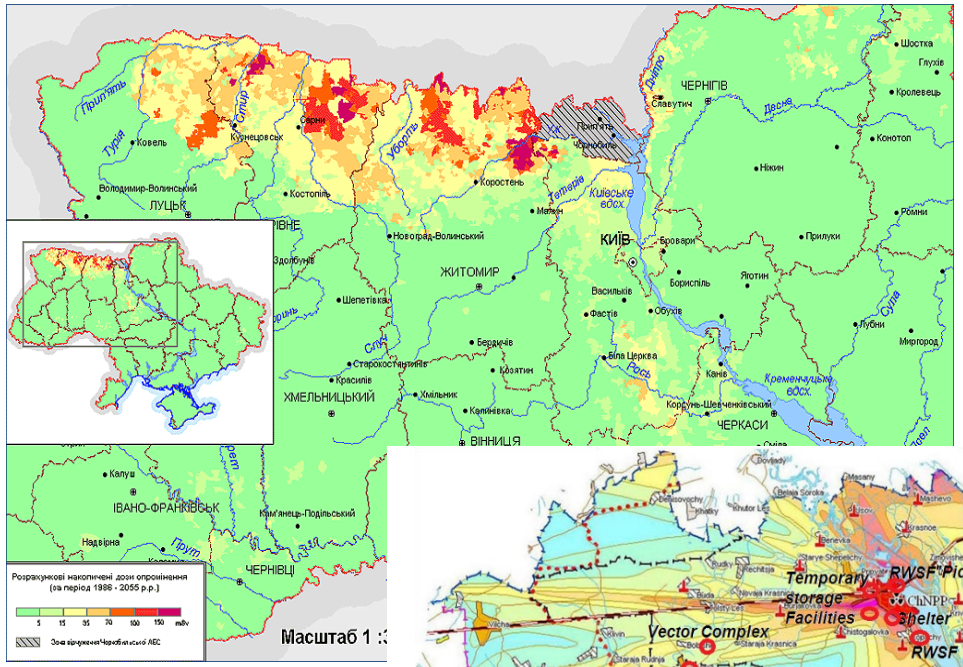


Status of the Chernobyl Exclusion Zone

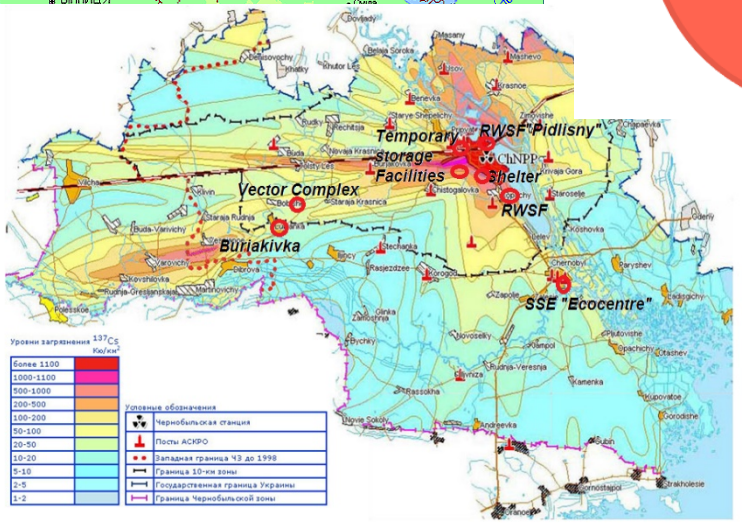
- Full name: The Exclusion Zone and the Zone of an Unconditional (Mandatory) Resettlement
- Area: 2 600 sq. km, 88% covered by Chernobyl Radiation and Ecological Biosphere Reserve
- No population, 6000 people personnel (shift workers), restricted access
- Town of Chernobyl – the only “populated” town
- Contains the national infrastructure for RW management
- Managed by State Agency on Exclusion Zone Management
- **Main function: serves as a barrier to the radiation**

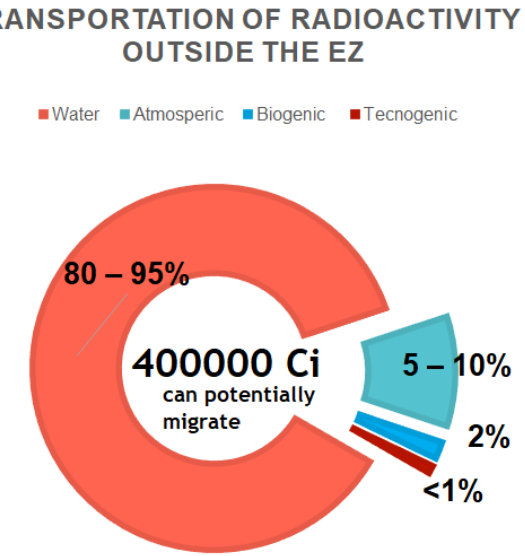
Status of the Chernobyl Exclusion Zone

Radioactive contamination



The biggest radiological hazard in ChEZ comes… from the territory itself





Animals transport more radionuclides outside ChEZ than is emitted from NSC

Name of the object	Activity, n×10^{15} Bq			
	TOTAL	^{137}Cs	^{90}Sr	TUE
Territory of ChEZ	8.13	5.5	2.5	0.13
Cooling pond	0.22	0.19	0.03	0.002
RAW Disposal facility	5.49	3.6	1.8	0.09
RAW Temporary storage facilities	2.14	1.4	0.7	0.04
TOTAL	16	10.7	5	0.26
The Shelter	340	190	145	4.5

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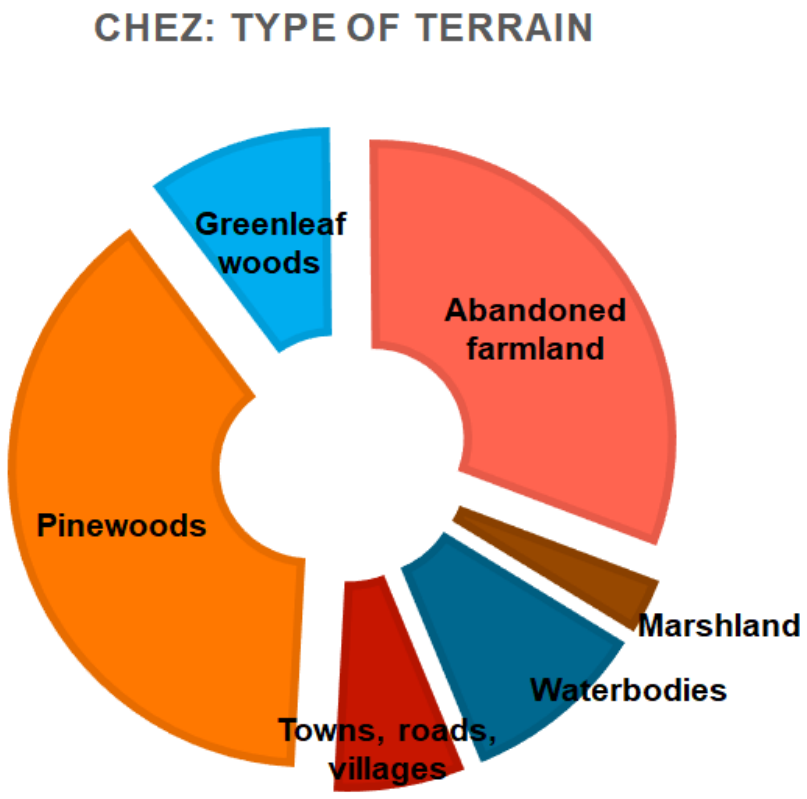
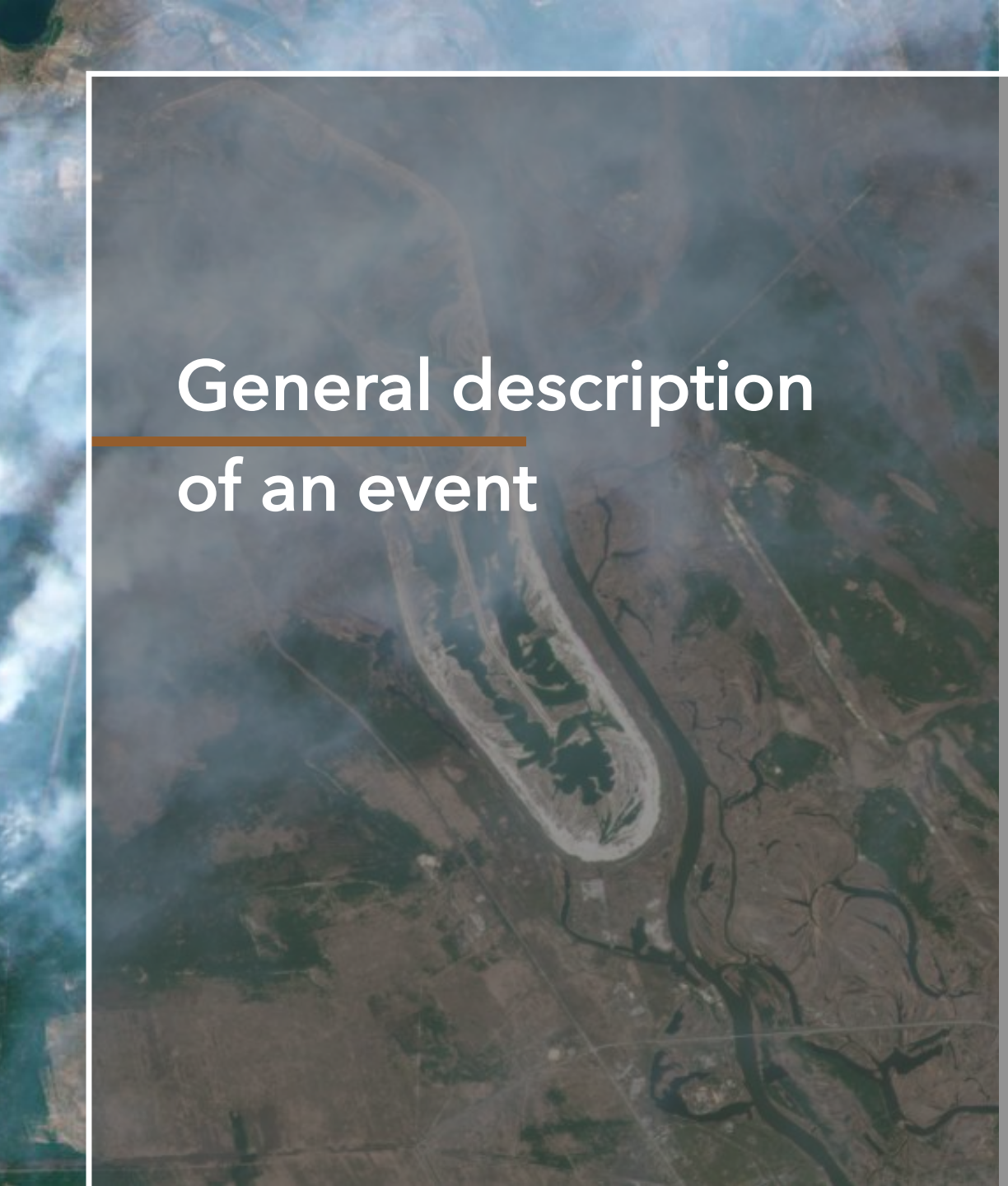
Status of the Chernobyl Exclusion Zone

Wildfires



Forestry	Wood (^{137}Cs, Bq/kg)	Bark (^{137}Cs, Bq/kg)	Ash, Bq/kg	
			^{137}Cs	^{90}Sr
Lubianske	70 - 400	800 - 1700	7000 - 40000	20000 - 75000
Kogorodske	60 – 160	590 - 900	4500	15000
Dytiatkivske	30 – 90	700 – 850	15000	59000

Small wildfires occur in ChEZ every year



General description of an event

- Period: 03 April – 07 May 2020
- Causes:

Dry winter and spring

Strong winds

Fires on the adjacent territories

Fires induced by shortcircuits

Arsons

- Total area affected: 115 sq. km (44 sq. miles); 5% of the Chernobyl Radiation and Ecological Biosphere Reserve
- Biggest wildfire in the history of ChEZ

General description of the event

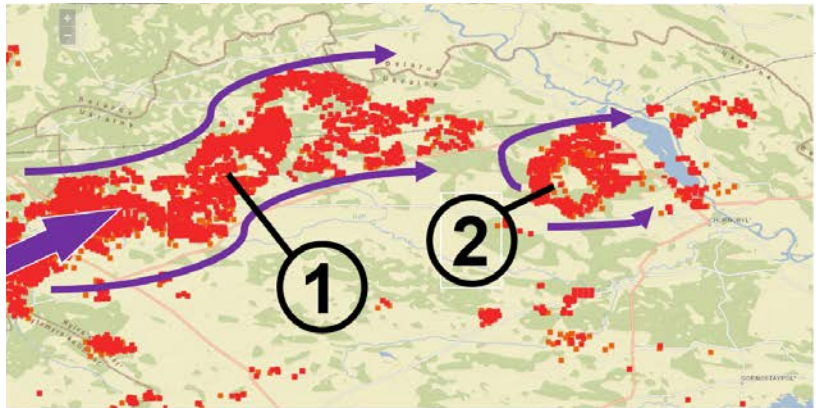
Chronology

On April 3-5 the wildfire came from Zhytomyr region to the western side of the ChEZ (Polisske) with burning areaas of approx. several ha.

During April 5-7 fire was located within Polisske village and goes deeper into the territory of ChEZ taking up the area more than 20 ha (zone 1).

On April 7-8 the second significant area started burning in the central part of the ChEZ (zone 2).

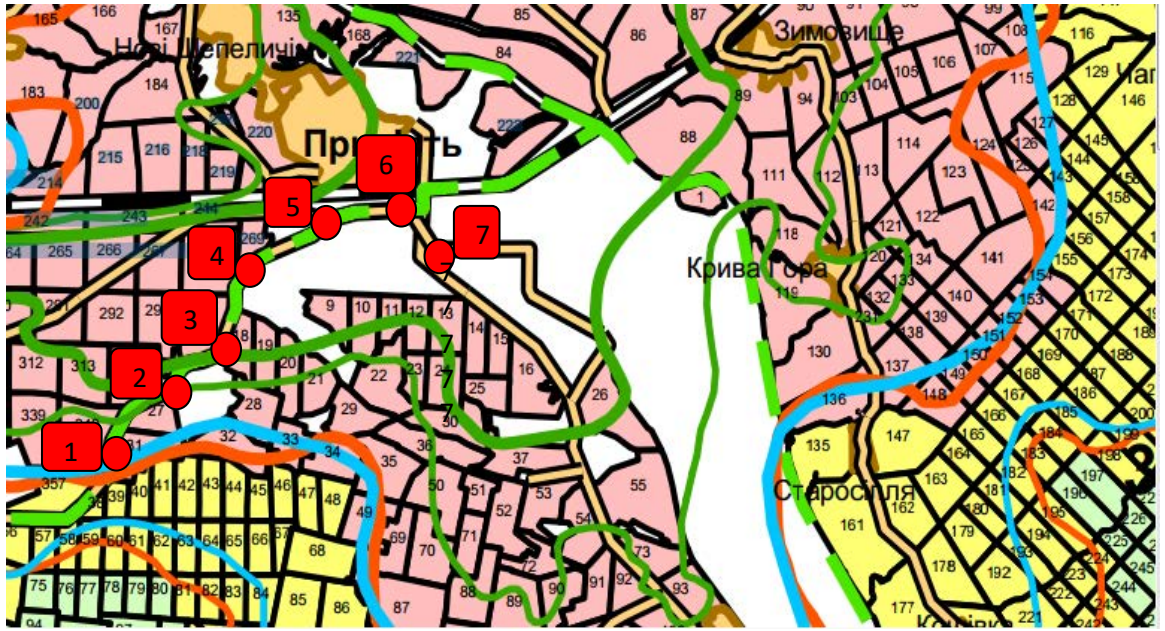
Acute phase: 05 – 13 April 2020.



Cumulative map of satellite fire zones in the Chernobyl Exclusion Zone with trajectories if their movement in April 2020 (VIIRS375m / NOAA-20 + SuomiNPP, MODIS / Aqua + Terra, https://firms.modaps.eosdis.nasa.gov/)

General description of the event

Radiation situation in ChEZ during fires *(data reported by ChEZ)*



13 April 2020

1. 0,45 - 0,50 μSv/h,
2. 0,9 - 1,2 μSv/h,
3. 5,2 - 5,6 μSv/h,
4. 5,5 - 6,0 μSv/h,
5. 0,6 - 0,8 μSv/h,
6. 3,0 - 3,5 μSv/h,
7. 25 - 30 μSv/h.

Control Levels of Cs-137 in the air exceeded in Chernobyl

Gamma dose-rates normal*

The town of Chernobyl on April 10, 2020

https://www.facebook.com/denis.vishnevskiy.7

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Activities conducted by SSTC NRS during the fires

SSTC NRS's activity in response to a combined emergency was initiated by SNRIU.

- **SSTC NRS functions during this event**:

Providing SNRIU with reliable forecasts of the situation and measurement data for verification

Supporting SNRIU in public information and answering requests

Experts were not present on the scene

- **Resources involved**:

DSS JRODOS and databases

Mobile radiation monitoring laboratory and an emergency crew

Operational messages from the ICC dispatcher

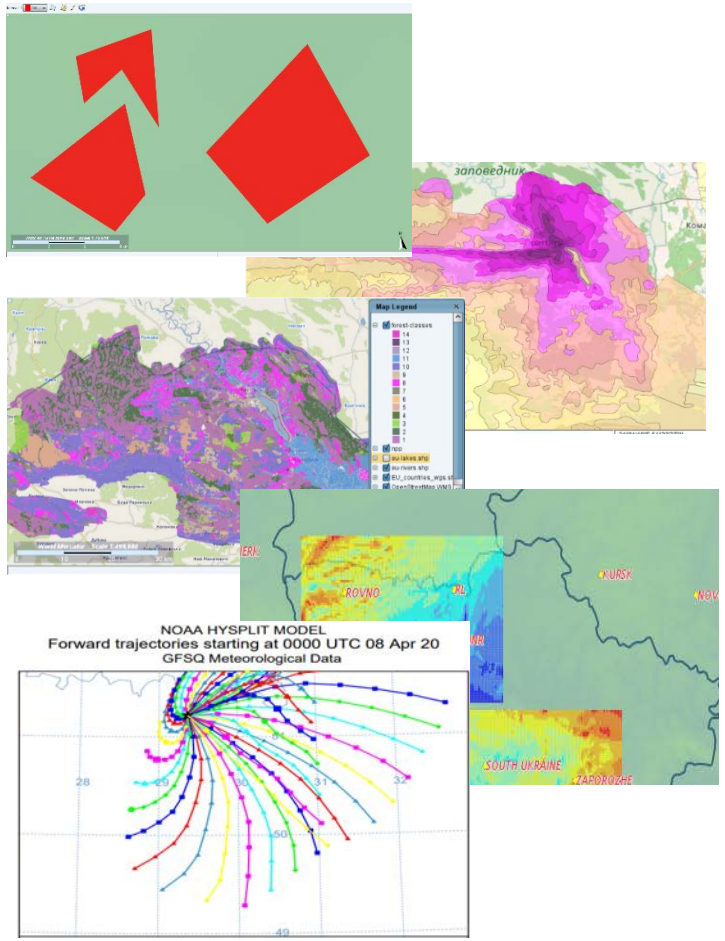
- **Specificities**:

Remote work due to the quarantine

Increased public concern due to the dust storm following the wildfires

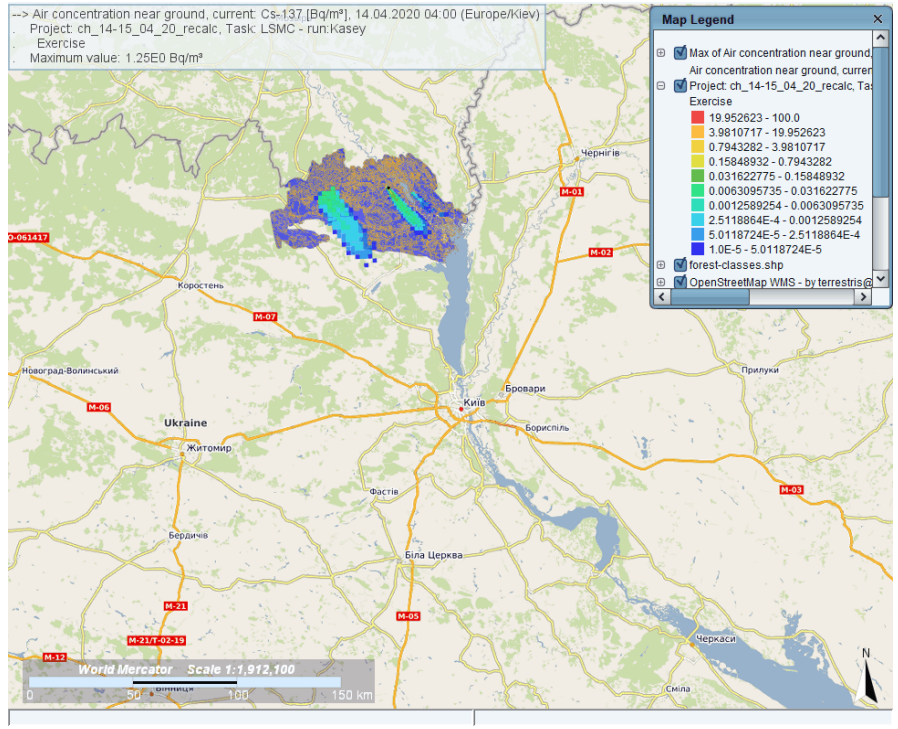
Activities conducted by SSTC NRS during the wildfires

Atmospheric dispersion modeling



- JRODOS wildfire module (LASAT ADM)
- Actual information on the fire zones
- Cs-137 and Sr-90 deposition database
- RODOS forest classes (types)
- Numerical weather predictions data (WRF model results)
- HYSPLIT trajectories

More than 40 JRODOS calculations during the event



JRODOS wildfire module results: current Cs-137 air concentrations, near-ground

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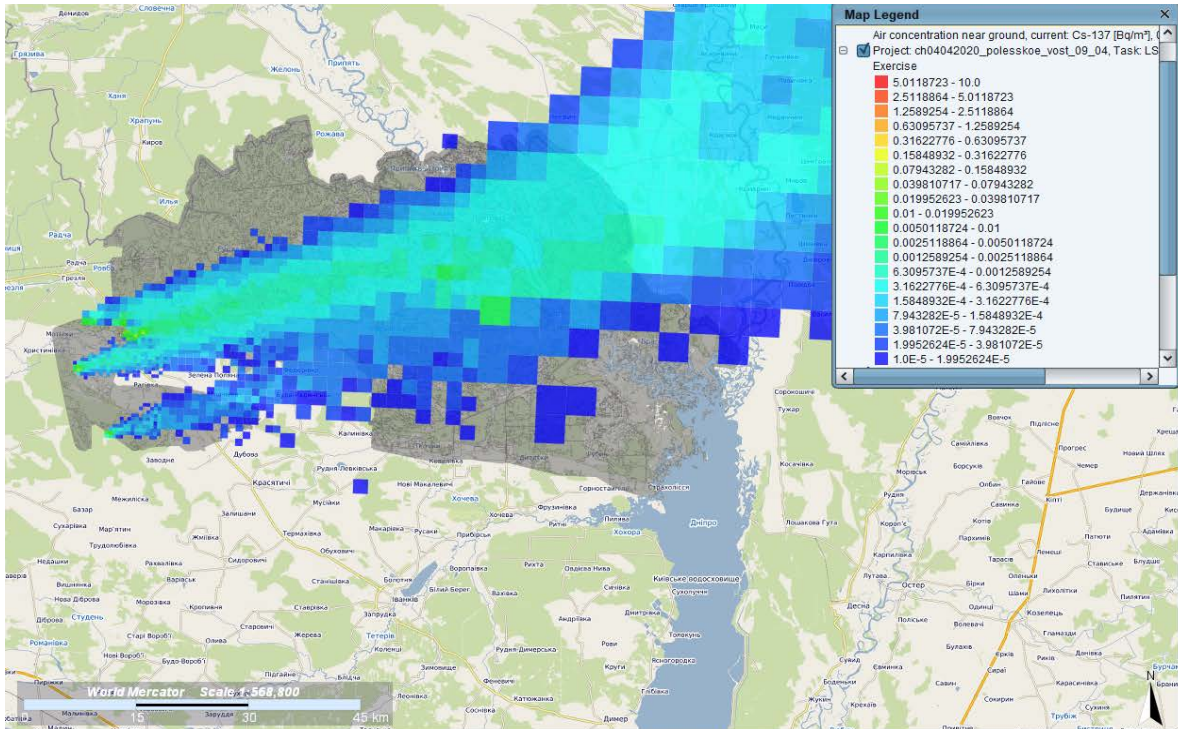
Activities conducted by SSTC NRS during the wildfires

Atmospheric dispersion modeling

Natural-color image observed by the MODIS on NASA's Aqua satellite *earthobservatory.nasa.gov* (April 09, 2020)

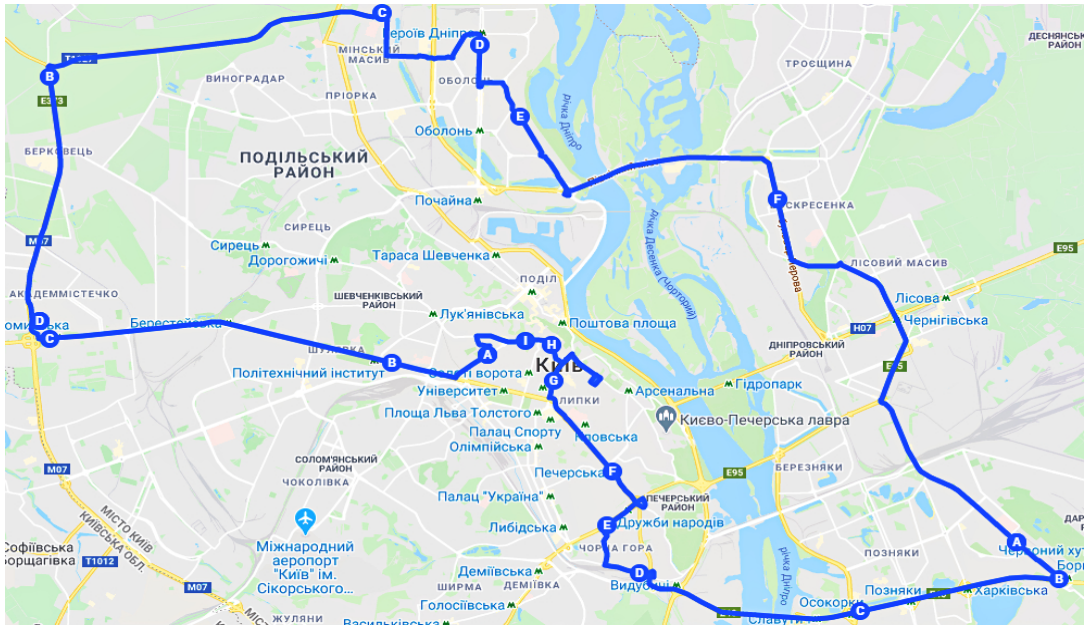


JRODOS modeling results: Cs-137 air concentrations, near-ground (April 09, 2020)

Activities conducted by SSTC NRS during the wildfires

Measurements in Kyiv

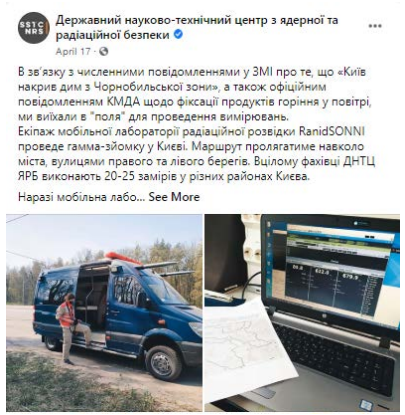
Air sampling

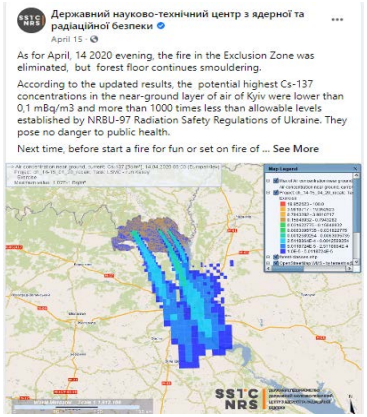


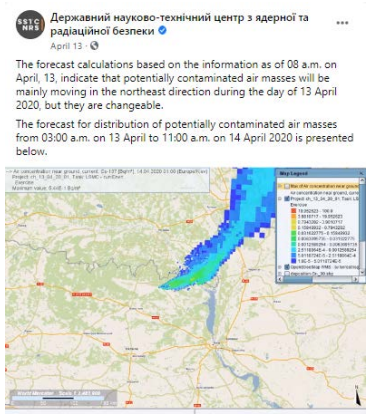
Gamma survey

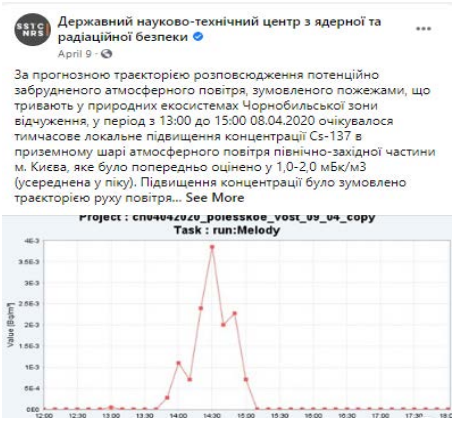
Activities conducted by SSTC NRS during the wildfires

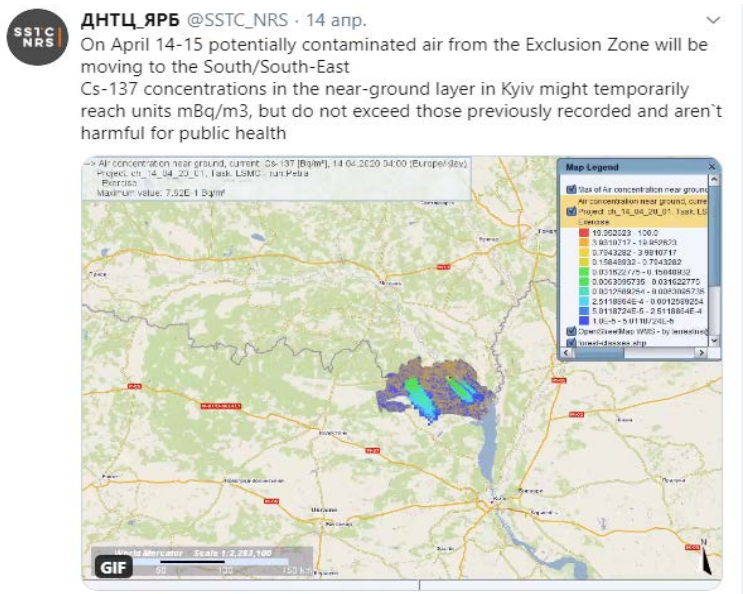
Public information











- Over 50 messages published on the SSTC NRS official website, Facebook, and Twitter
- Comments for the biggest national TV-channels
- Responds to public and media requests
- Information was used by SNRIU for the international information exchange through the IAEA IEC and on a bilateral framework (Poland, France, Norway)

Conclusions and lessons learned

- SNRIU and SSTC NRS were the major sources of the operative information about the radiation situation in Kyiv region during the fires.
- Experience of remote work and communications during the combined emergency situation was successful.
- Support and consultations from the international community were an important factor which contributed to confidence.
- The radiological consequences of the ash resuspension during the dust storm cannot be currently assessed. The issue of the hot particles potentially transported outside ChEZ in still open, too.

https://www.facebook.com/denis.vishnevskiy.7

Thank you for your attention

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