

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

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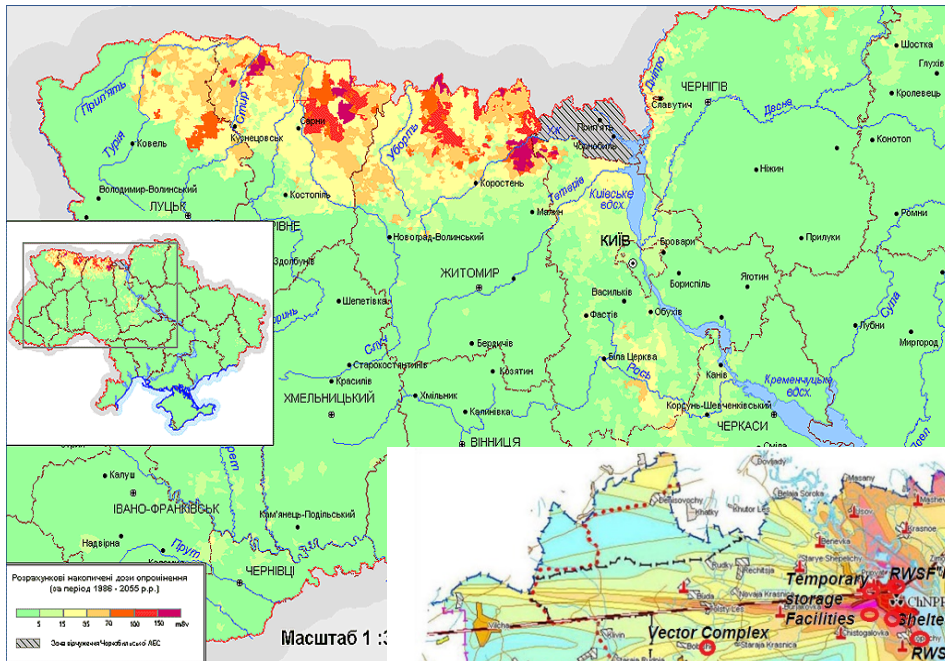


Status of the Chernobyl Exclusion Zone

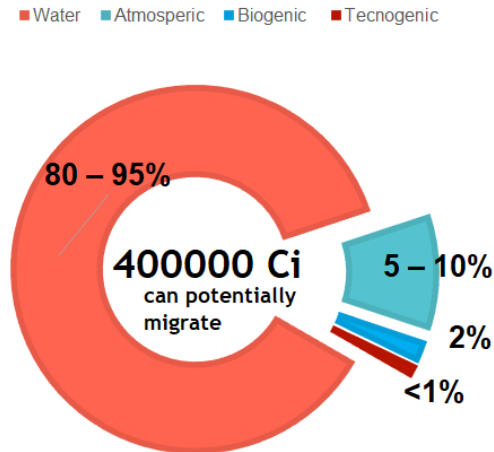
- Full name: The Exclusion Zone and the Zone of an Unconditional (Mandatory) Resettlement
- Area: 2 600 sq. km, 88% covered by Chernobyl Radiation and Ecological Biosphere Reserve
- No population, 6000 people personnel (shift workers), restricted access
- Town of Chernobyl – the only “populated” town
- 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

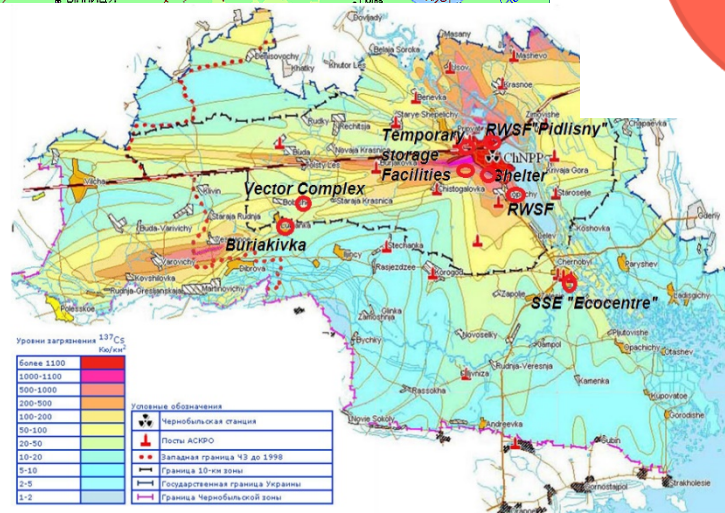


TRANSPORTATION OF RADIOACTIVITY OUTSIDE THE EZ



Animals transport more radionuclides outside ChEZ than is emitted from NSC

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

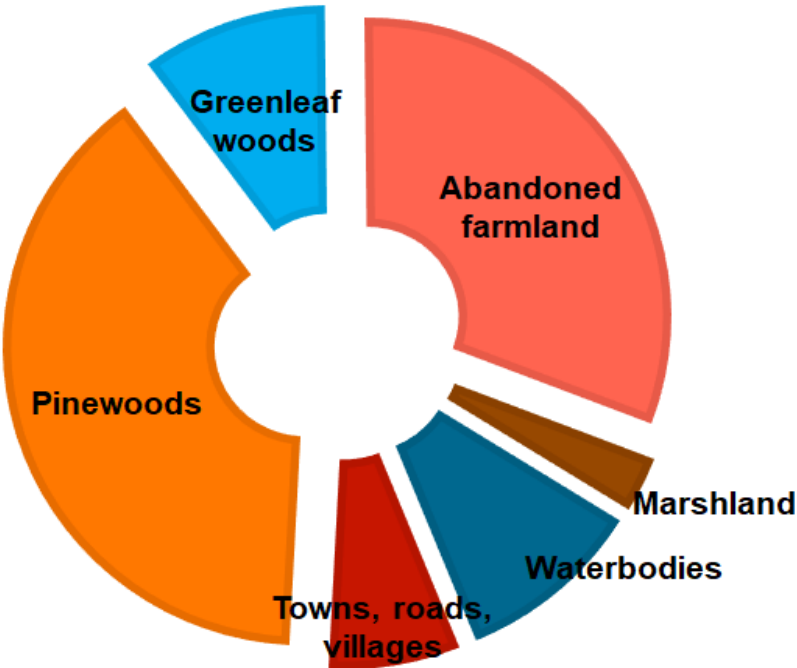


Name of the object	Activity, $n \times 10^{15}$ Bq			
	TOTAL	^{137}Cs	^{90}Sr	TUE
Territory of ChEZ	8.13	5.5	2.5	0.13
Cooling pond	0.22	0.19	0.03	0.002
RAW Disposal facility	5.49	3.6	1.8	0.09
RAW Temporary storage facilities	2.14	1.4	0.7	0.04
TOTAL	16	10.7	5	0.26
The Shelter	340	190	145	4.5

Status of the Chernobyl Exclusion Zone

Wildfires


CHEZ: TYPE OF TERRAIN



Small wildfires occur in ChEZ every year

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





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

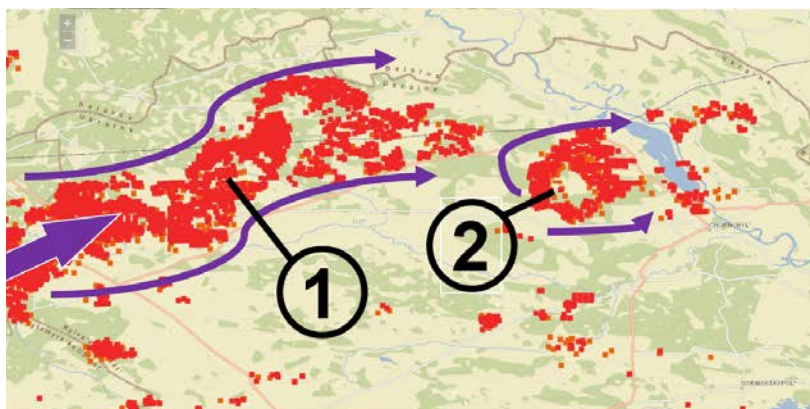
Chronology

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

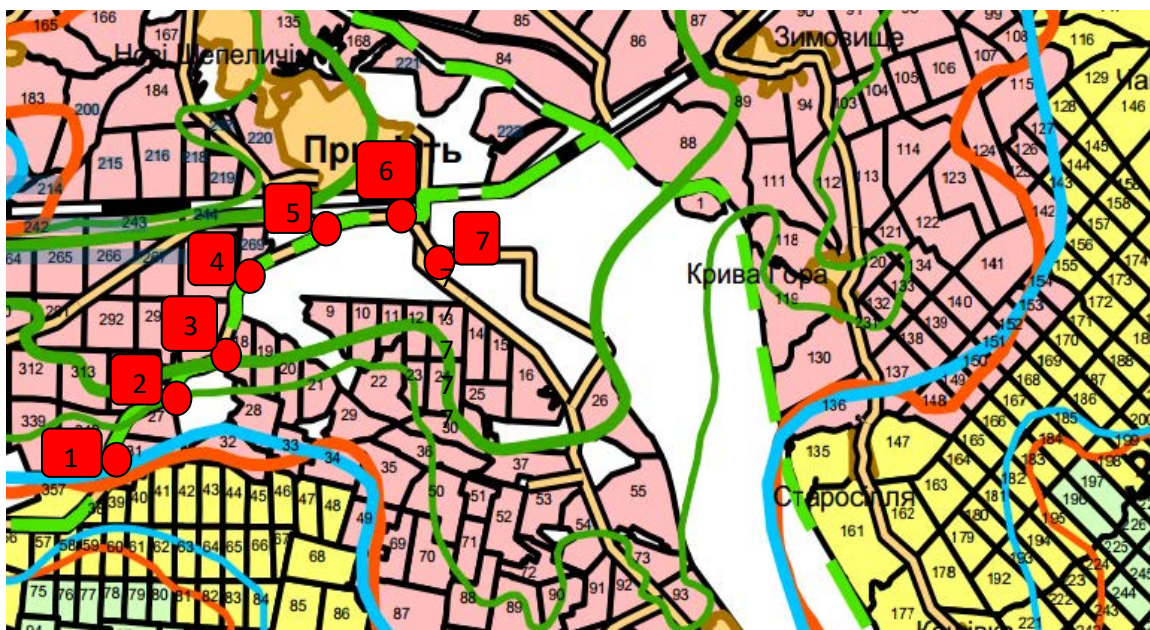
Acute phase: 05 – 13 April 2020.



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 $\mu\text{Sv/h}$,
2. 0,9 - 1,2 $\mu\text{Sv/h}$,
3. 5,2 - 5,6 $\mu\text{Sv/h}$,
4. 5,5 - 6,0 $\mu\text{Sv/h}$,
5. 0,6 - 0,8 $\mu\text{Sv/h}$,

6. 3,0 - 3,5 $\mu\text{Sv/h}$,
7. 25 - 30 $\mu\text{Sv/h}$.

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>



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

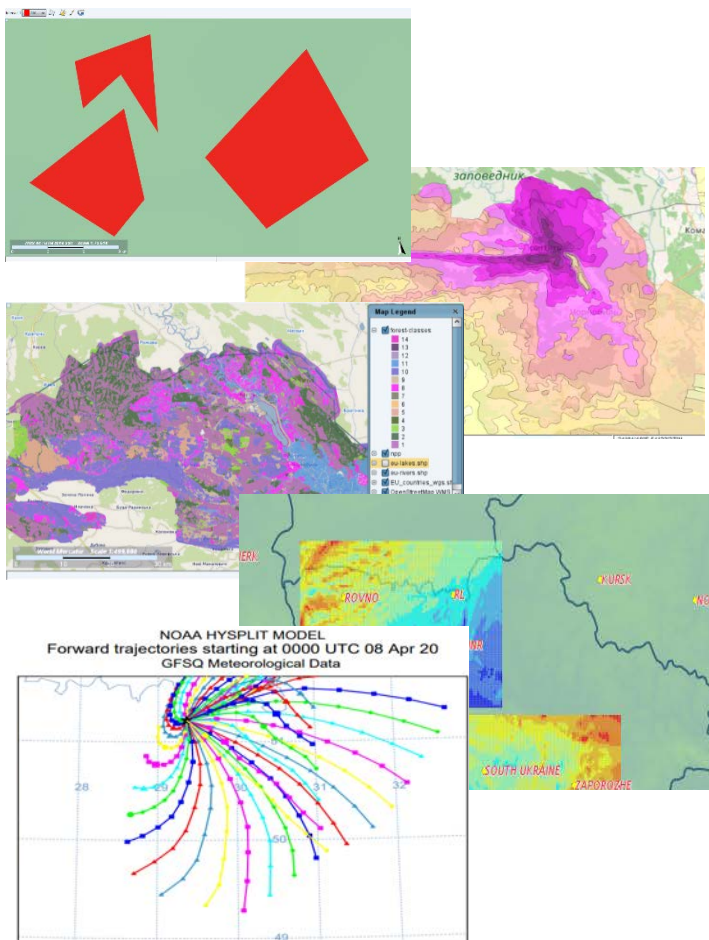
- **Specificities:**

Remote work due to the quarantine

Increased public concern due to the dust storm following the wildfires

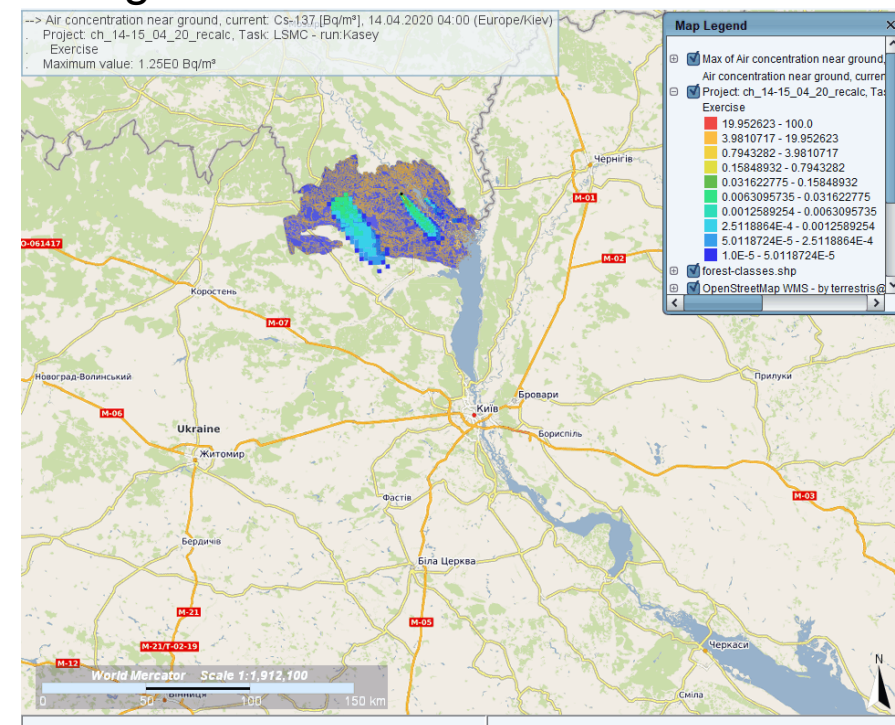
Activities conducted by SSTC NRS during the wildfires

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



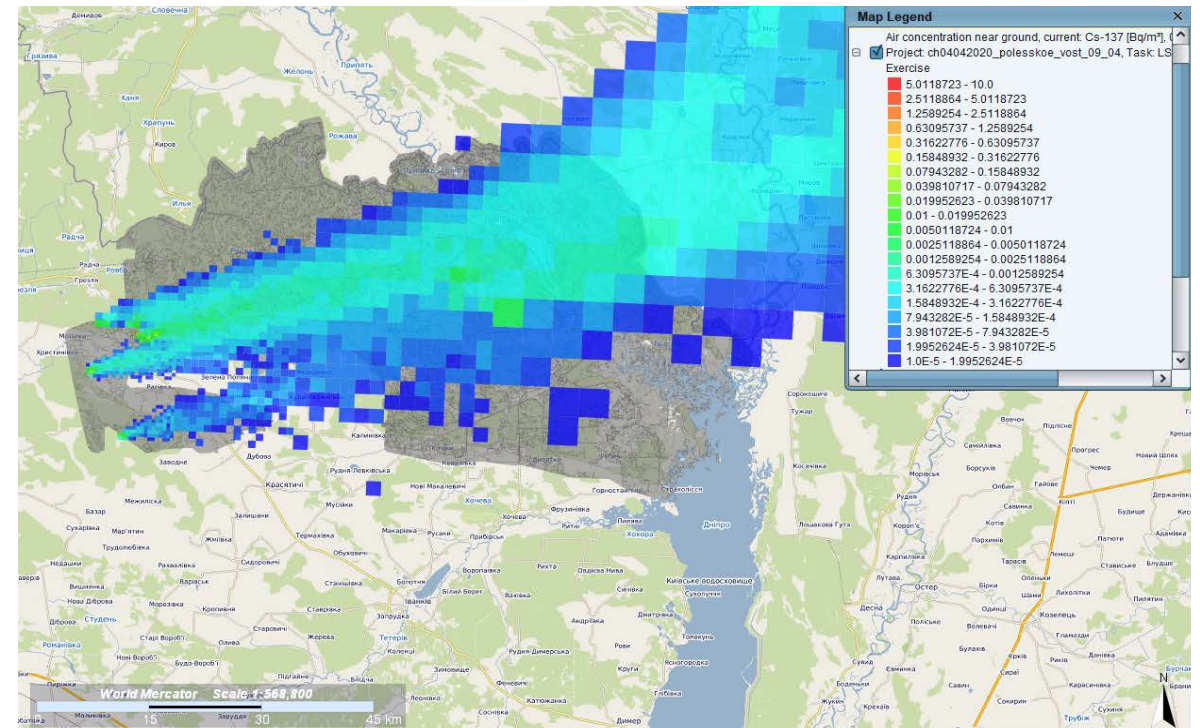
JRODOS wildfire module results: current Cs-137 air concentrations, near-ground

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)



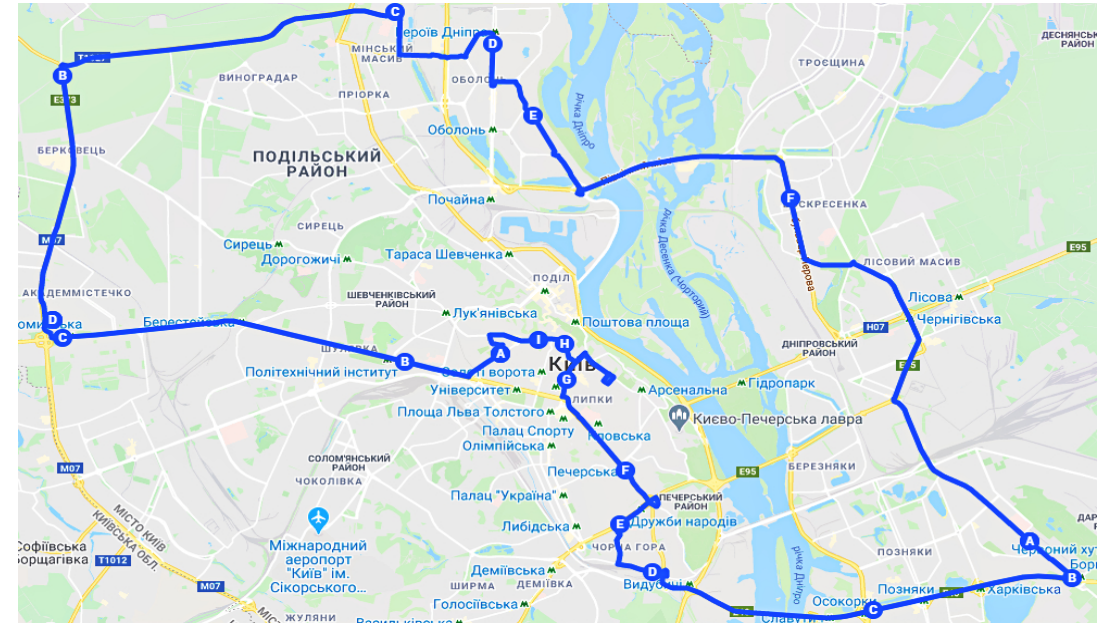
JRODOS modeling results: Cs-137 air concentrations, near-ground (April 09, 2020)

Activities conducted by SSTC NRS during the wildfires

Measurements in Kyiv



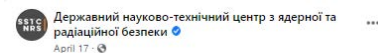
Air sampling



Gamma survey

Activities conducted by SSTC NRS during the wildfires

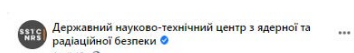
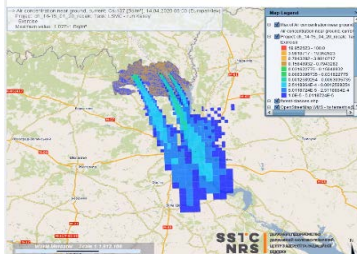
Public information



В зв'язку з численними повідомленнями у ЗМІ про те, що «Київ накрив дим з Чорнобильської зони», а також офіційним повідомленням КМДА щодо фіксації продуктів горіння в повітрі, ми виїхали в "поля" для проведення вимірювань. Екіпаж мобільної лабораторії радіаційної розвідки RadissonNI проведе гамма-зйомку у Києві. Маршрут пролягатиме навколо міста, вулицями правого та лівого берегів. Вцілому фактично ДНТЦ ЯРБ виконують 20-25 замірів у різних районах Києва. Наразі мобільна лабо... See More



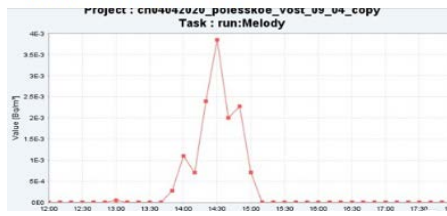
As for April, 14 2020 evening, the fire in the Exclusion Zone was eliminated, but forest floor continues smouldering. According to the updated results, the potential highest Cs-137 concentrations in the near-ground layer of air of Kyiv were lower than 0.1 mBq/m³ and more than 1000 times less than allowable levels established by NRB-U-97 Radiation Safety Regulations of Ukraine. They pose no danger to public health. Next time, before start a fire for fun or set on fire of... See More



The forecast calculations based on the information as of 08 a.m. on April, 13, indicate that potentially contaminated air masses will be mainly moving in the northeast direction during the day of April 13, 2020, but they are changeable. The forecast for distribution of potentially contaminated air masses from 03:00 a.m. on April 13 to 11:00 a.m. on April 14 2020 is presented below.



За прогнозом траєкторією розповсюдження потенційно забрудненого атмосферного повітря, зумовленого пожежами, що тривають у природних екосистемах Чорнобильської зони відлучення, у період з 13:00 до 15:00 08.04.2020 очікувалося тимчасове локальне підвищення концентрації Cs-137 в приземному шарі атмосферного повітря північно-західної частини м. Києва, яке було попередньо оцінено у 1,0-2,0 мБк/м³ (усереднено у піку). Підвищення концентрації було зумовлено траєкторією руху повітря... See More



- 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)



ДНТЦ ЯРБ @SSTC_NRS · 17 апр.

- просп.Юрія Гагаріна-Харківське Шосе-просп. Миколи Бажана-Південний міст-вул. Саперно-Слобідська – Залізничне Шосе-6-р Дружби Народів – 6-р Лесі Українки-вул. Хрещатик-вул. Велика Житомирська – вул. Бульварно-Кудрявська-просп.Перемоги-ул.Василя Стуса, 35-37(офіс ДНТЦ ЯРБ)



Показать эту ветку



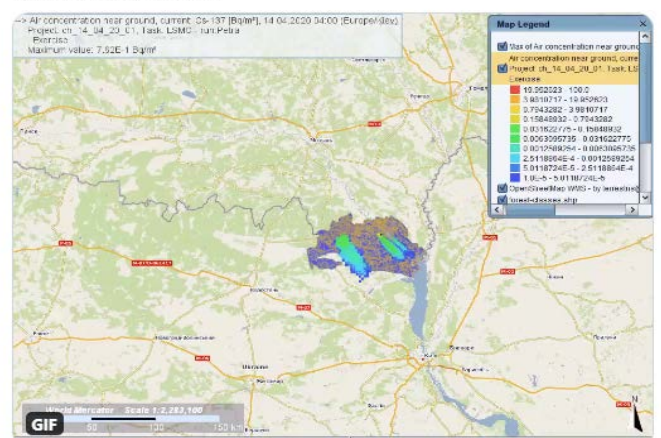
ДНТЦ ЯРБ @SSTC_NRS · 17 апр.

Маршрут: вул. Василя Стуса, 35-37 (офіс ДНТЦ ЯРБ) – Велика Кільцева Дорога – вул Сім'ї Кульженків – вул. Полярна – вул. Героїв Дніпра – Оболонський проспект – проспект Героїв Сталінграда – Північний міст – бульвар Перова – проспект Алішера Навої – вул. Миропільська –



ДНТЦ ЯРБ @SSTC_NRS · 14 апр.

On April 14-15 potentially contaminated air from the Exclusion Zone will be moving to the South/South-East Cs-137 concentrations in the near-ground layer in Kyiv might temporarily reach units mBq/m³, but do not exceed those previously recorded and aren't harmful for public health



An aerial photograph showing the aftermath of a forest fire. The landscape is covered in dark, charred ground and sparse, dead trees. A line of red fire trucks is parked along a dirt road that runs diagonally across the lower part of the image. The sky is clear and blue.

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 is still open, too.

Thank you for your attention

Підписуйтесь:



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[SSTC NRS](https://www.youtube.com/SSTC_NRS)



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