

**FEDERAL SERVICE FOR HYDROMETEOROLOGY
AND ENVIRONMENTAL MONITORING**



**NATIONAL RESEARCH INSTITUTE OF
AGRICULTURAL METEOROLOGY**

**YU. A. IZRAEL INSTITUTE OF
GLOBAL CLIMATE AND ECOLOGY**

CLIMATE RISKS IN THE AGRICULTURAL CROPS CULTIVATION

Vera N. Pavlova, Sergey M. Semenov

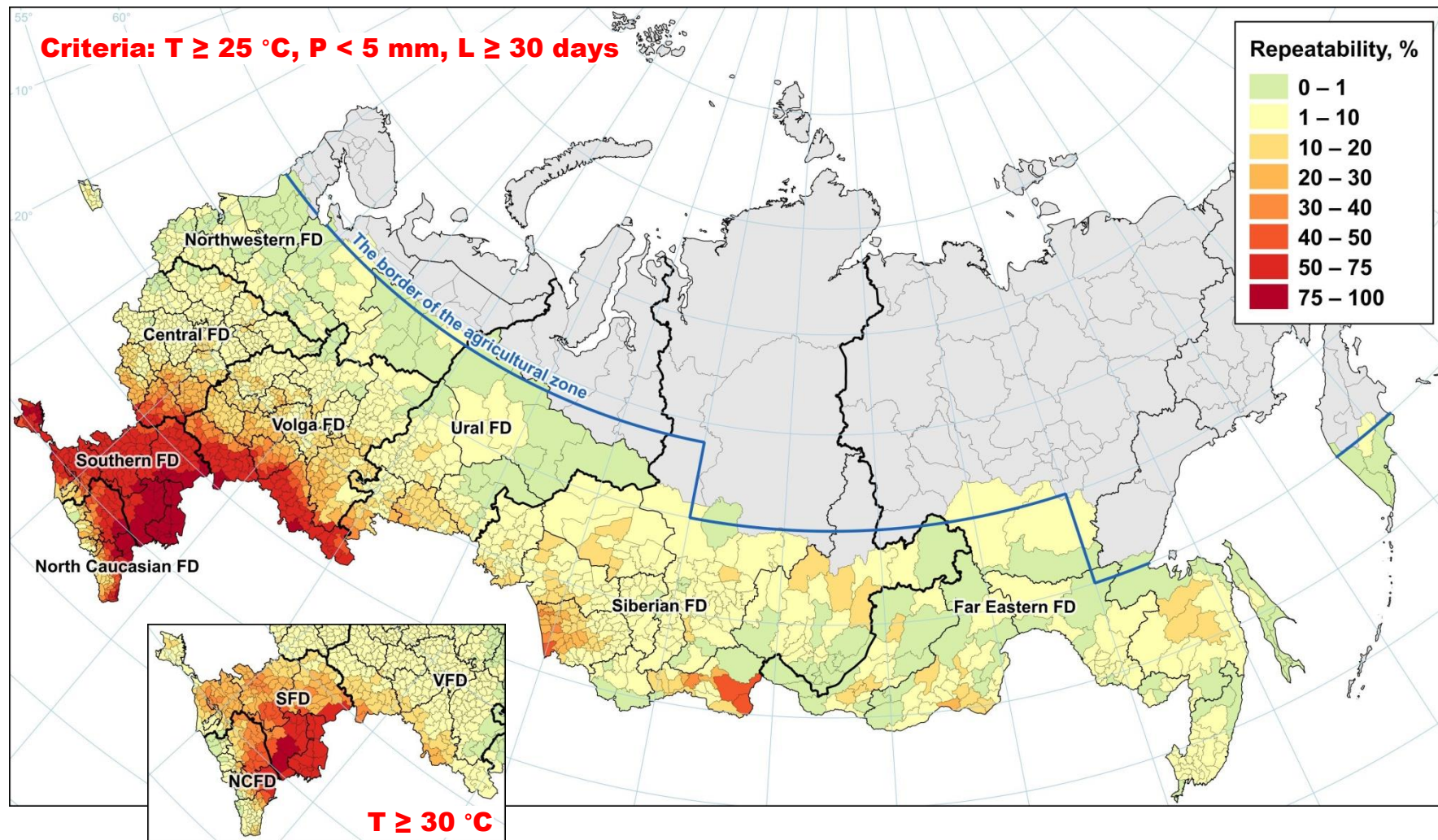
INTRODUCTION

Extreme weather and climate events, including heat waves, droughts, hot winds, heavy rainfall and others, are a significant factor threatening food security in many countries of the world. As shown in the recently released Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), observed and projected global warming can increase the frequency and severity of such phenomena. To effectively adapt to these processes, first of all, regional information on the relevant climate threats is needed.

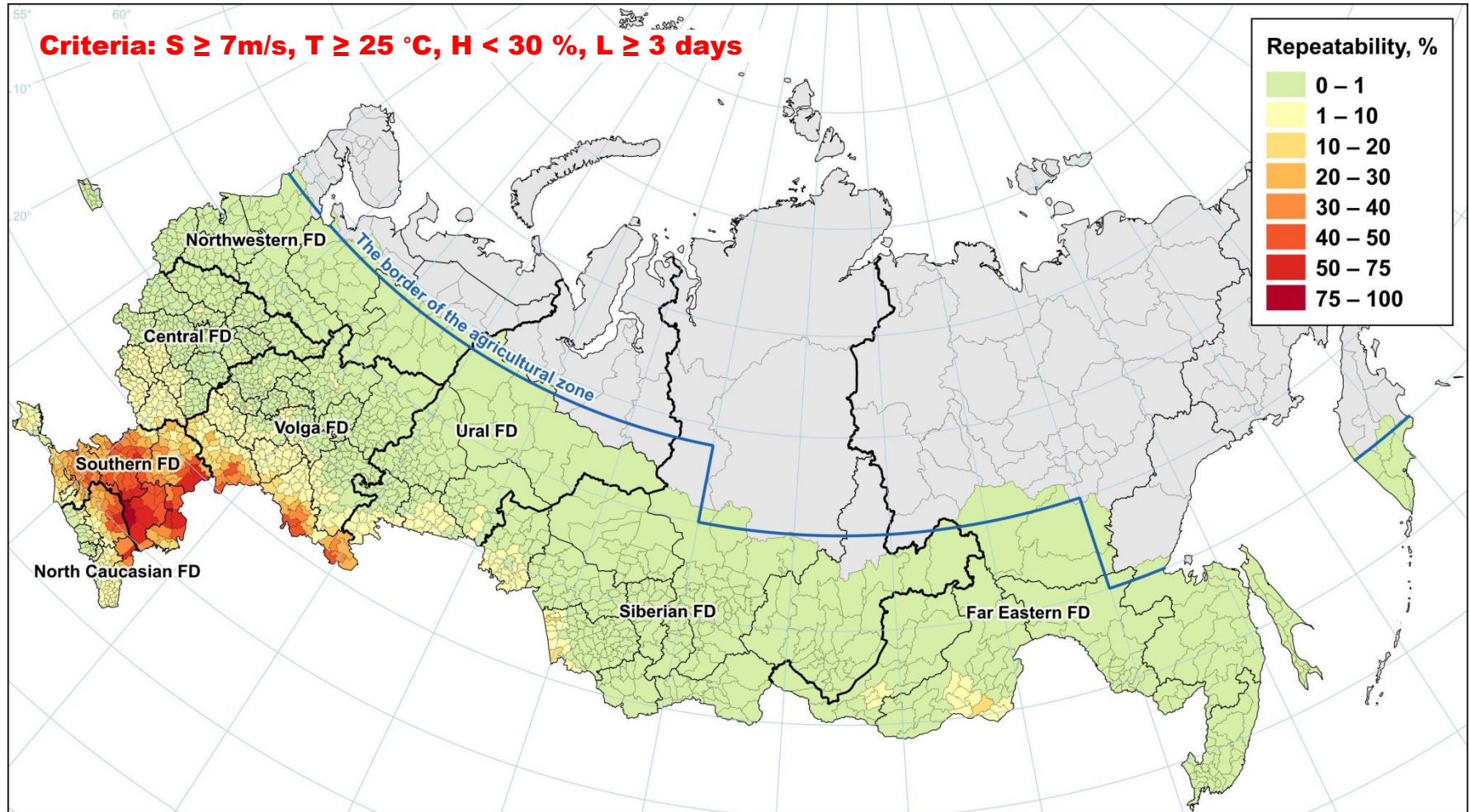
In this talk we present information on Russia

- about the occurrence (frequency, repeatability) of such phenomena as drought, dry wind and ice crust at the end of the 20th century and the beginning of the 21st century;**
- about the change in the climate-based yield of spring wheat for the same period;**
- about changes in the conditions of climate aridity in the thirties and fifties of the 21st century in comparison with the last decade of the 20th of the century.**

Occurrence of hazardous event DROUGHT in April-October assessed from data on 1984-2018



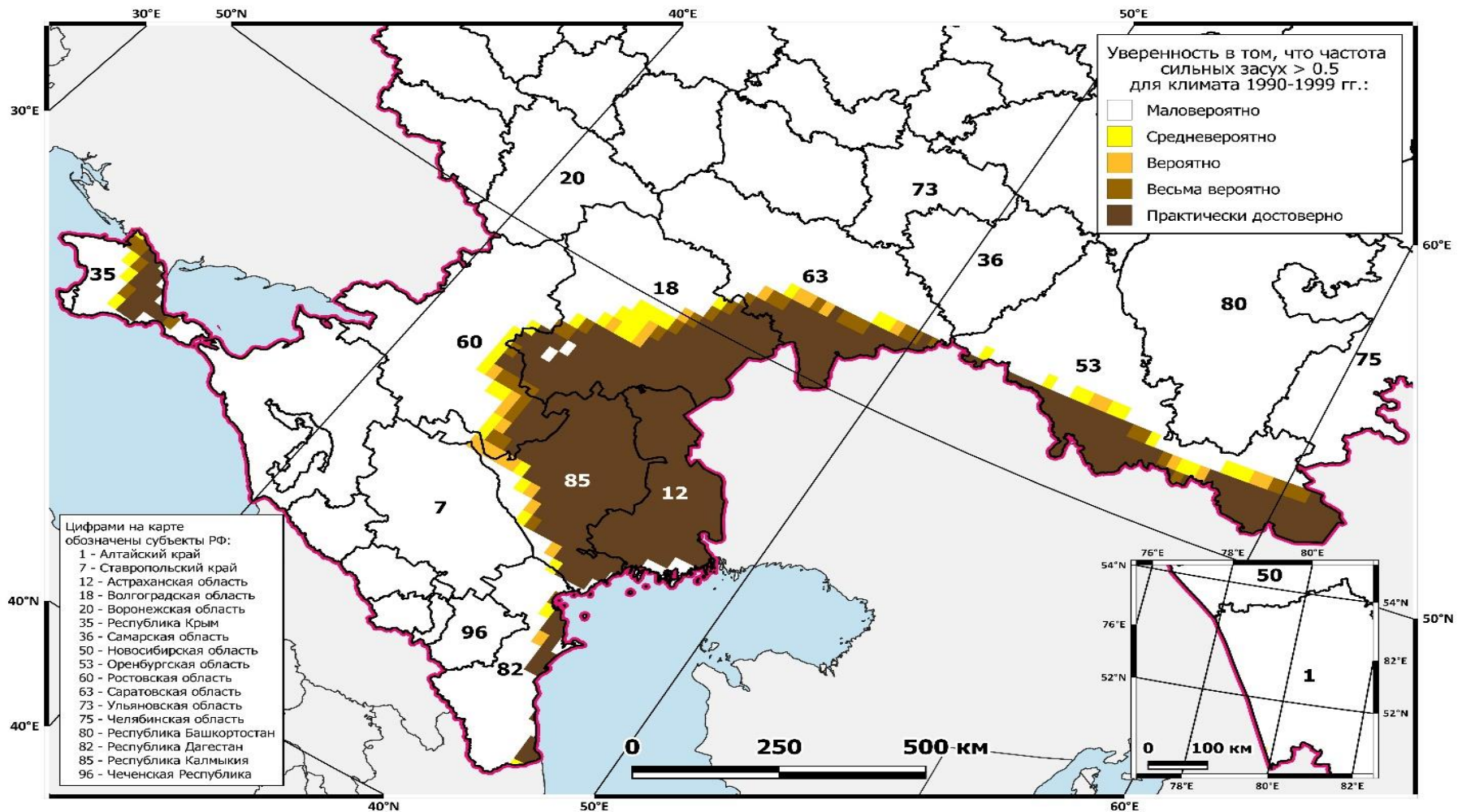
Occurrence of hazardous event HOTWIND in April-October assessed from data on 1984-2018



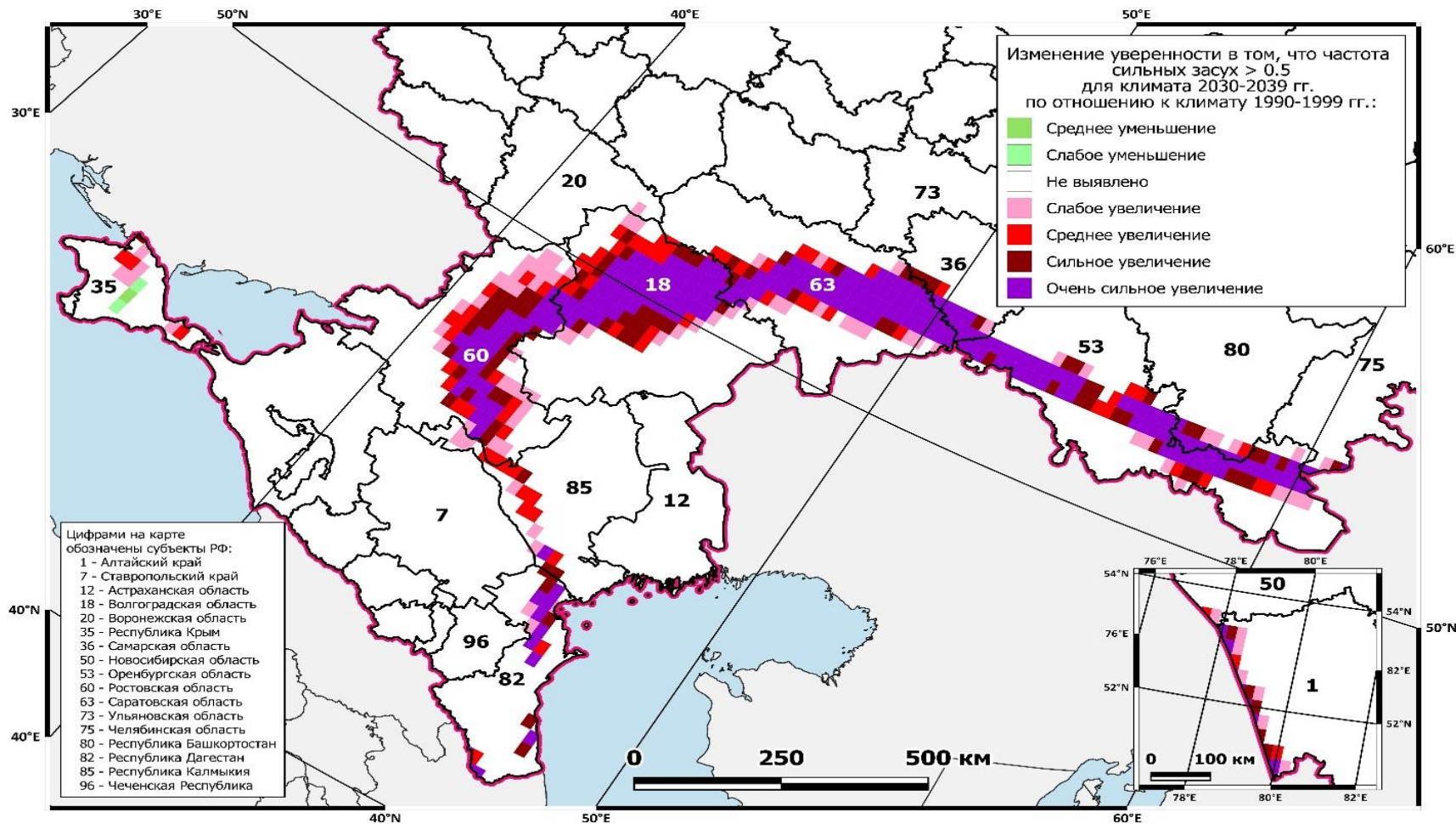
Occurrence of hazardous event ICE CRUST in December-March assessed from data on 1984-2018



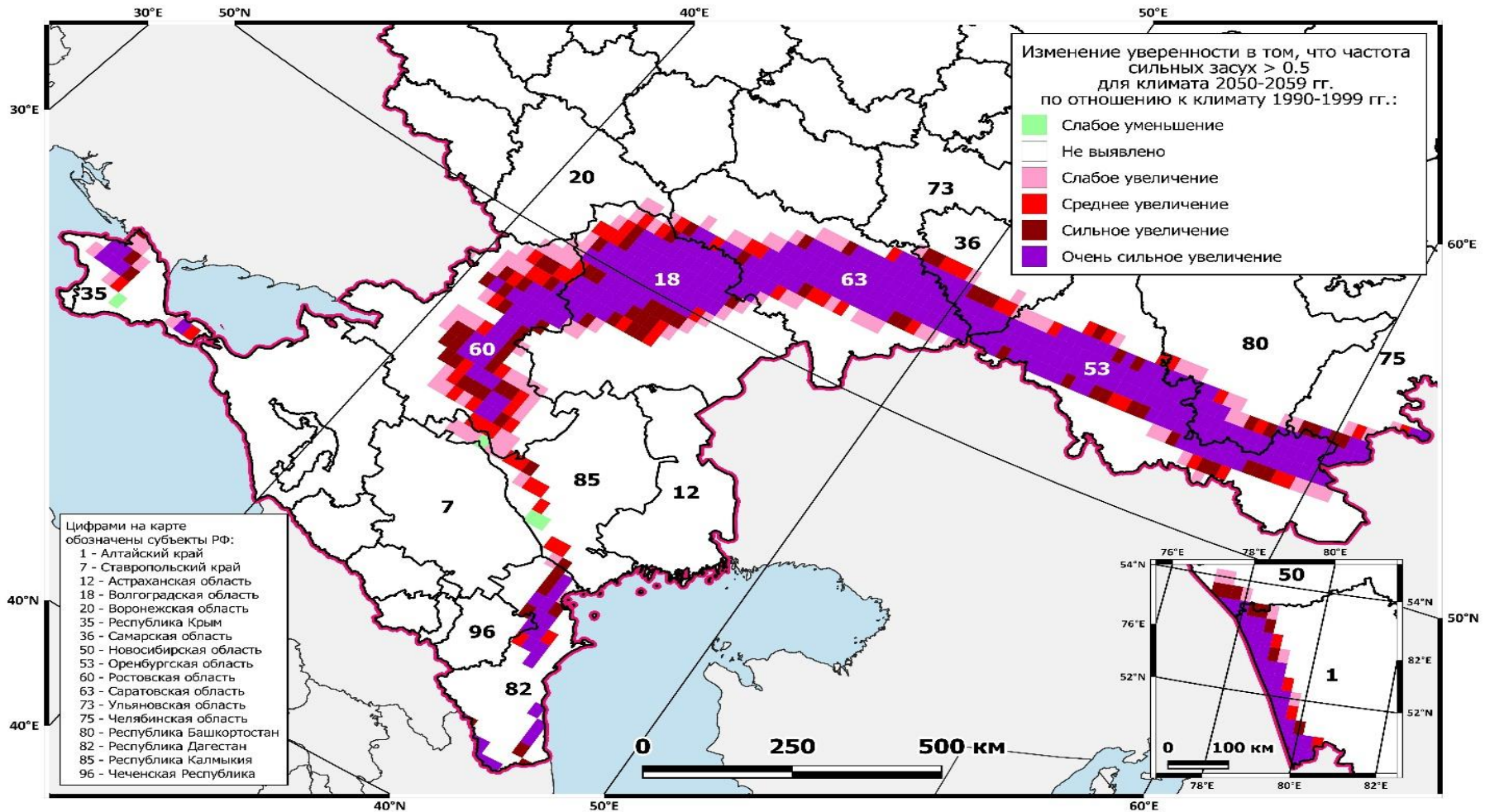
Confidence in hazardous climate aridity for grain crops in Russia in 1990-1999, scores (from low-0 to virtually certain-4) (assessed from data of the Climate Centre of Roshydromet and CRU)



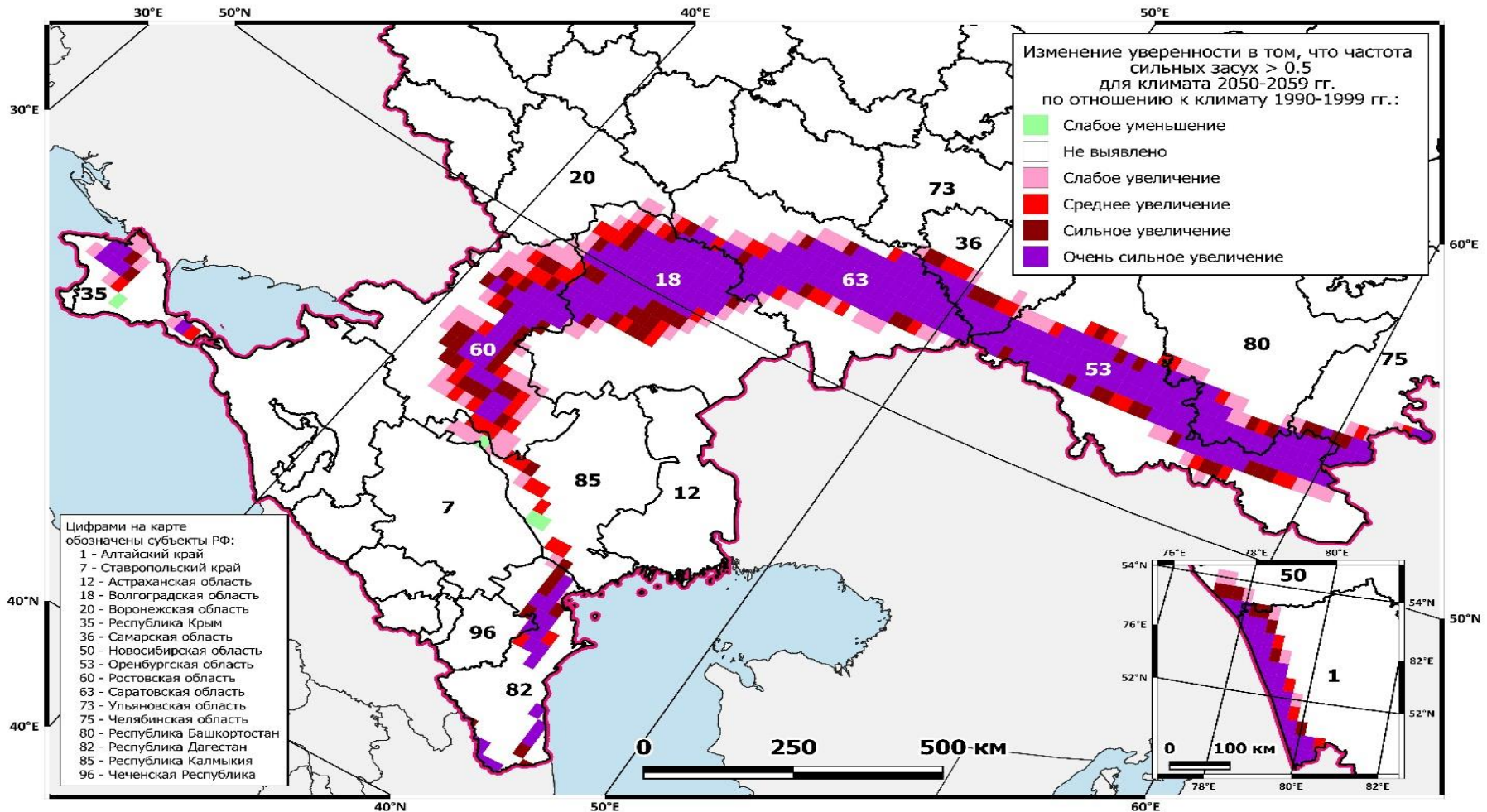
Changes in confidence in hazardous climatic dryness for grain crops over Russia: 2030-2039 vs. 1990-1999: scenario RCP8.5



Changes in confidence in hazardous climate aridity for grain crops over Russia: 2050-2059 vs. 1990-1999: scenario RCP8.5

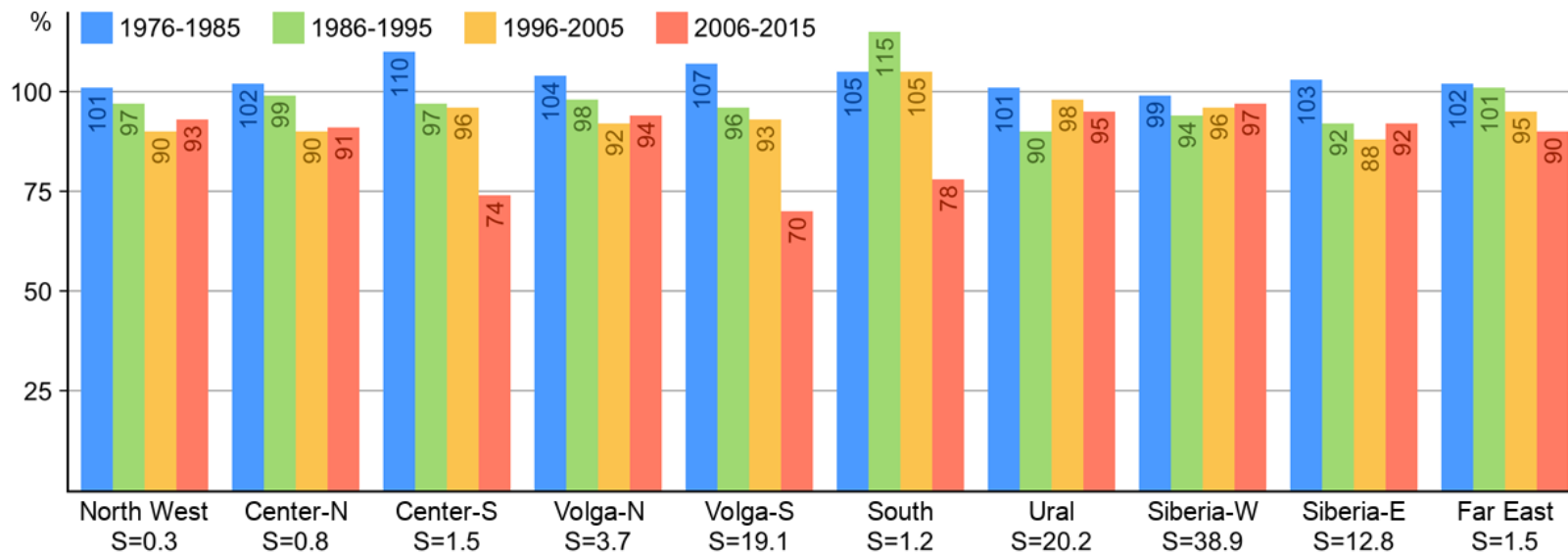


Changes in confidence in hazardous climate aridity for grain crops over Russia: 2050-2059 vs. 1990-1999: scenario RCP8.5



ASSESSMENT OF THE SPRING WHEAT CLIMATE BASED YIELD (%) RELATIVE TO 1961-1990 IN RUSSIA REGIONS

(CLIMATE-SOIL-YIELD SIMULATION SYSTEM)



Designations: S – the share of the sown area in the region from the total for the Russia, %; in regions names: N – North, S – South, W – West, E – East.

From 2006 to 2015, the climate-based yield decreased by:

- 20-25 % – in the south and south-east of the European part of Russia,
- 8-10 % – in Eastern Siberia and the Far East,
- 3-5 % – in the Urals and Western Siberia.

In Russia as a whole, the climate-based yield decreased by about 10-12 % from 1976 to 2015, i. e. the rate of its decline was about 2.5 % per decade.

CONCLUSION

Dangerous hydrometeorological phenomena - drought, hot wind, ice crust - were observed on the territory of Russia in the late 20th - early 21st centuries in southern Russia.

These events, including in a strong form, took place in some grain-producing regions of the country. In the last decade the climate-based yield in Russia reduced by 2.5 % per decade.

As the scenario assessments show, in the context of the continuing strong anthropogenic impact on the Earth's climate system (scenario RCP8.5), climate-based risks for grain production in Russia associated with climate aridity will increase.

THANK YOU!

If you have any questions, please send them to my e-mail address

Vera Pavlova (NRIAM)

E-mail: vnp2003@bk.ru

Sergey Semenov (IGCE)

E-mail: semenov@igce.ru