Climate change impacts on water and soil quality- a Carpathian perspective

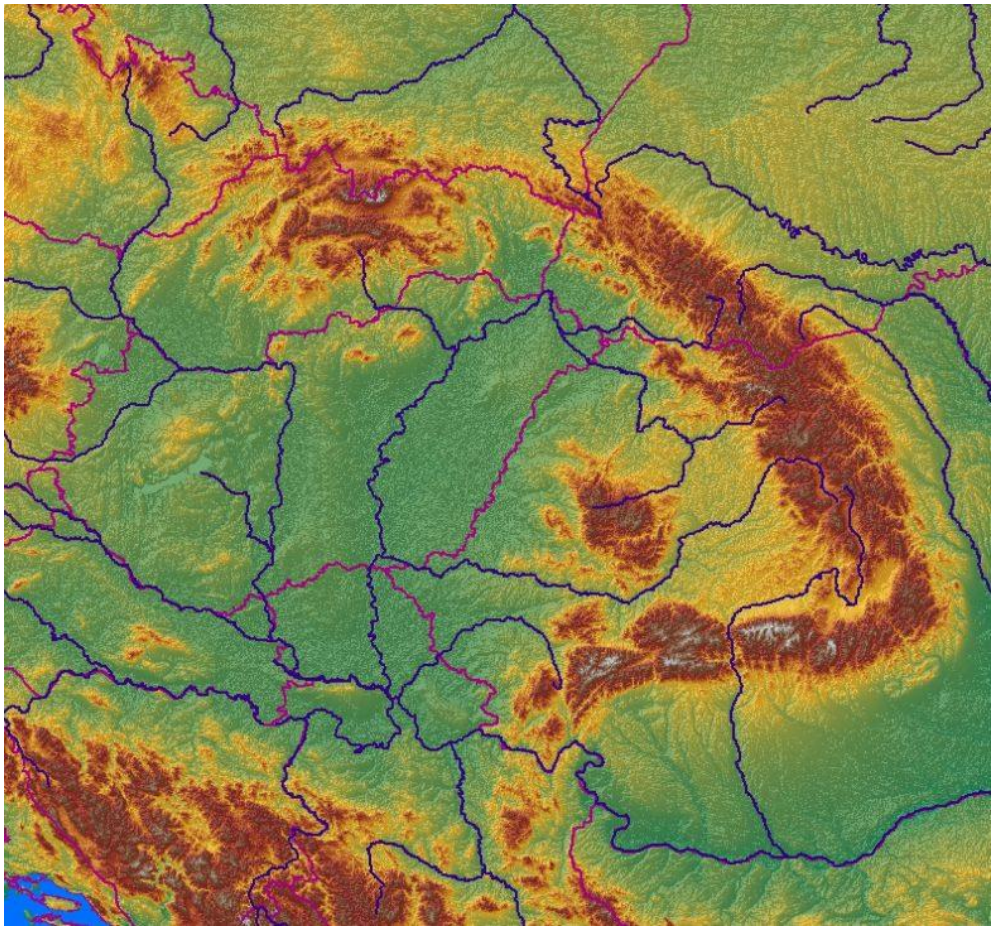
Harald Egerer
Carpathian Convention

CARPATHIAN CONVENTION

UNEP

The Carpathians

- Largest, longest, most twisted and fragmented mountain range in Europe
- Over 50% of the territory natural and semi-natural forests
- Providing essential ecosystem goods to communities in seven countries
- High vulnerability to climate change



CARPATHIAN CONVENTION

UNEP

The Carpathian Convention

- Adopted on 22nd May 2003
- Entered in force on 4th January 2006
- Ratified by all the seven Carpathian countries
- Biodiversity, Agriculture, Forestry, Tourism….
- A framework Convention for cooperation and multi-sectoral policy coordination

Goal: Protection and Sustainable Development of the Carpathian Region

CARPATHIAN CONVENTION

UNEP

Cooperation with Danube strategy

EU Strategy for the Danube Region (EUSDR)

- **Priority Area 06** Biodiversity, landscapes, quality of air and soils – Ecological corridors, prevention of wildlife crime
- **Priority Area 02** Energy – Local and regional conditions for sustainable use of RES with a focus on the Carpathians (rural) and urban areas

DANUBE REGION strategy

CARPATHIAN CONVENTION

UNEP

Cooperation with ICPDR

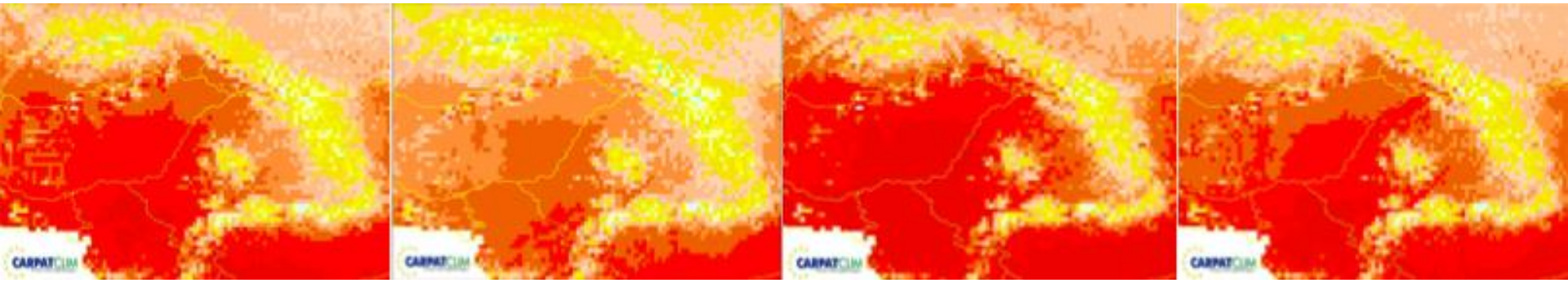
- Joint Declaration between ICPDR and Carpathian Convention on cooperation in the Tisza Basin
- Close cooperation with ICPDR on the EUSDR in the Danube area
- *Guiding principles on sustainable hydropower development in the Danube Basin*" (DECISION COP4/3 par 2)

icpdr iksd
International Commission for the Protection of the Danube River
Internationale Kommission zum Schutz der Donau

CARPATHIAN CONVENTION

UNEP

Climate Change in the Carpathians- temperature trends



1961 1962 2009 2010

Units: [°C]

-1.00	-0.01
0.00	0.99
1.00	1.99
2.00	2.99
3.00	3.99
4.00	4.99
5.00	5.99
6.00	6.99
7.00	7.99
8.00	8.99
9.00	9.99
10.00	10.99
11.00	11.99
12.00	13.99
14.00	15.99

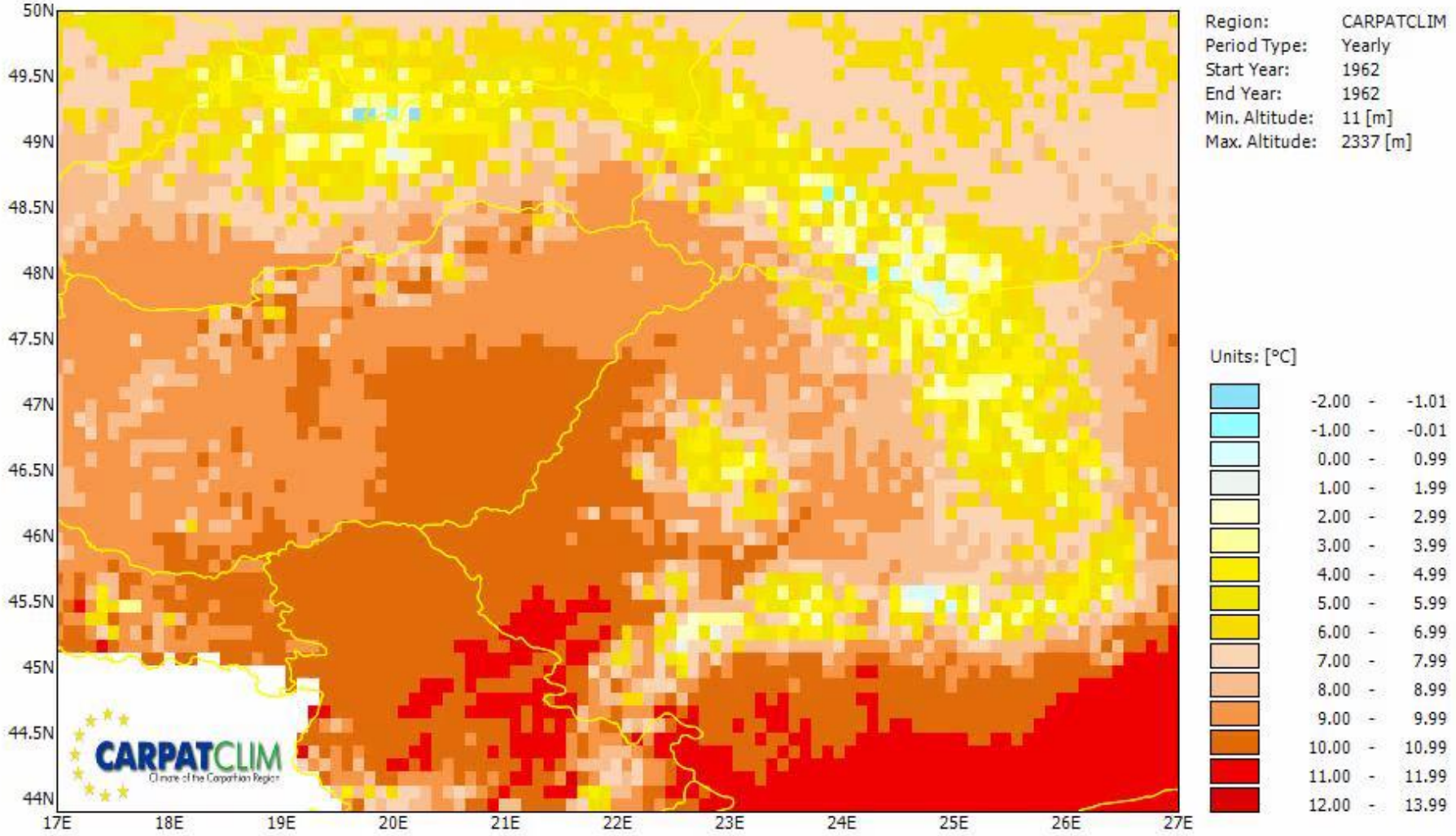
In the Carpathian Region the average annual temperature has increased between 0.6°C and 1.6°C.

Projections estimate that it will increase by between 3°C and 4.5°C by the end of the century. This trend can be seen in the picture above showing a comparison between two cold years (1962 - 2010) and two hot years (1961 - 2009) and in the video in the next slide.

CARPATHIAN CONVENTION

UNEP

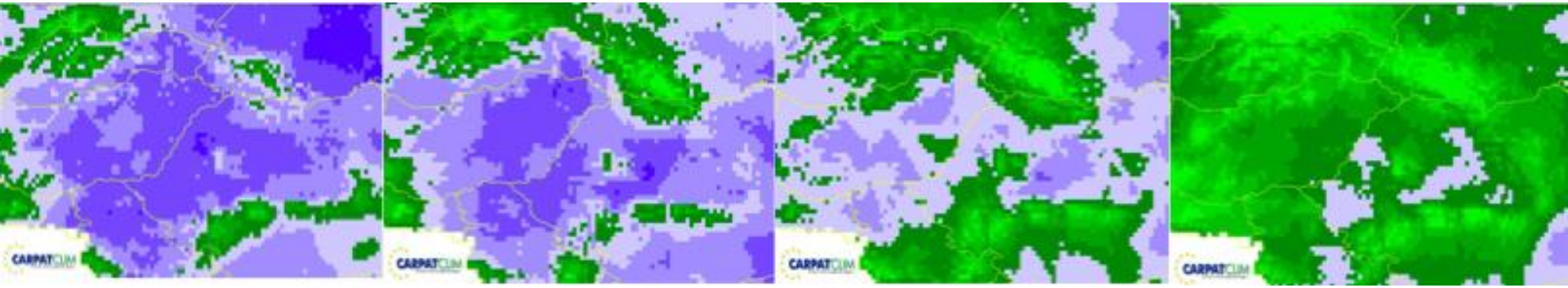
Mean air temperature



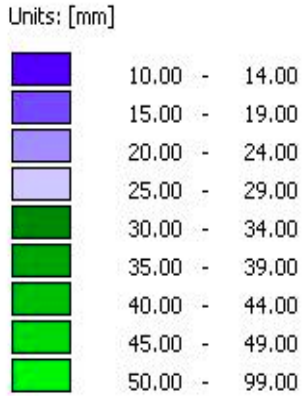
CARPATHIAN CONVENTION

UNEP

Climate Change in the Carpathians- precipitation trends



1961 1962 2009 2010



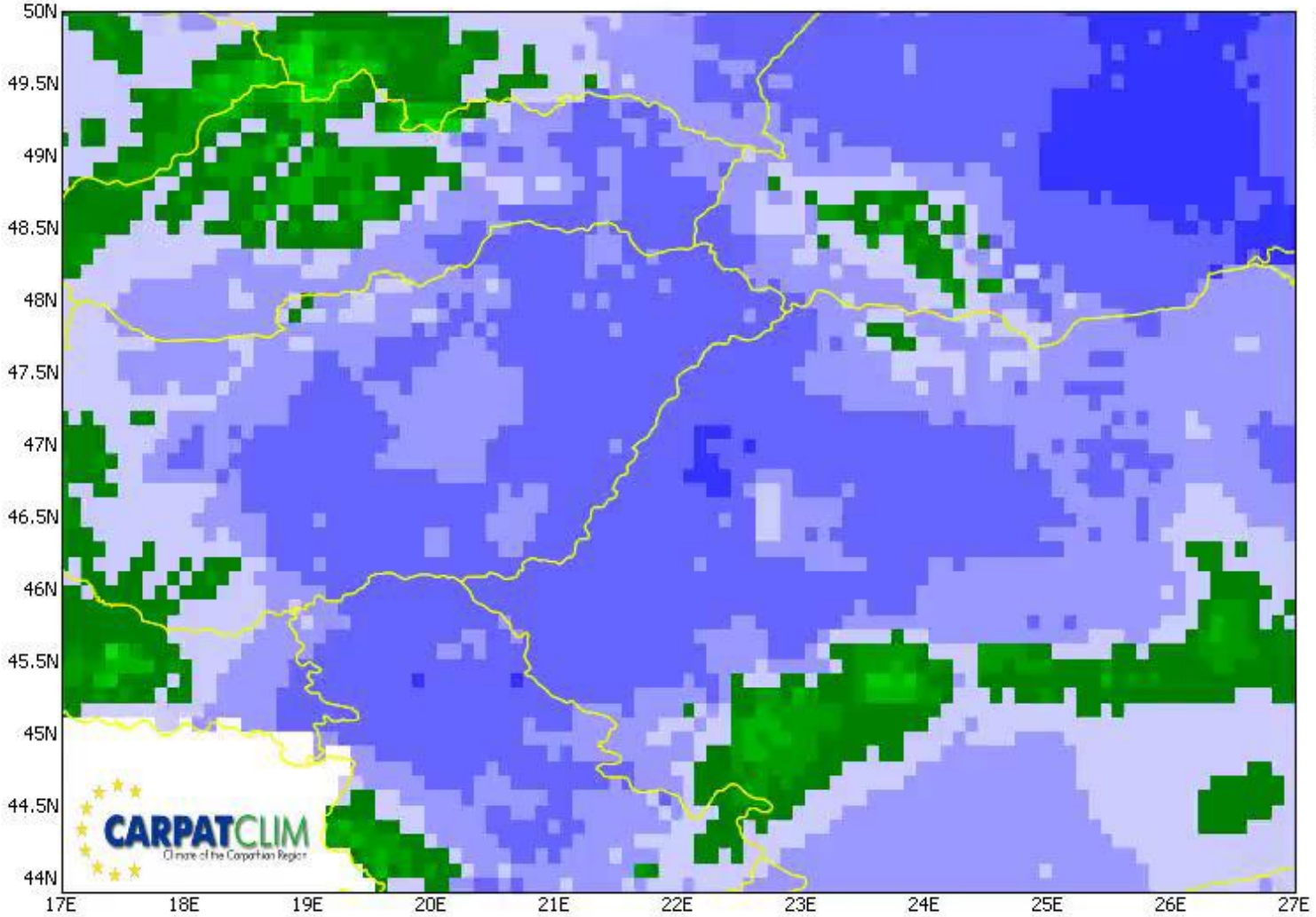
A change in precipitation patterns and a higher inter-annual variability has been recorded in the Carpathian region.

This trend can be seen in the picture above showing a comparison of precipitation trends (maximum total 5 day rainfall) between two year 50 years ago and today. The same increasing inter-annual variability and growing likelihood of extreme weather events is shown the video in the next slide.

CARPATHIAN CONVENTION

UNEP

Maximum 5-day total rainfall



Region: CARPATCLIM
Period Type: Yearly
Start Year: 1961
End Year: 1961
Min. Altitude: 11 [m]
Max. Altitude: 2337 [m]

Units: [mm]

10.00	14.00
15.00	19.00
20.00	24.00
25.00	29.00
30.00	34.00
35.00	39.00
40.00	44.00
45.00	49.00
50.00	99.00

CARPATHIAN CONVENTION

UNEP

Vulnerability and adaptation- soil quality

The expected variation in temperature and precipitation trends will have a negative impact on the quality of soil:

- More concentrated precipitation in shorter periods of time will increase landslide risks
- In some areas the decline of river levels in summer will increase the likelihood of drought events
- The higher probability of extreme weather events is expected to increase soil erosion

CARPATHIAN CONVENTION

UNEP

Vulnerability and adaptation- water quality

The expected variation in precipitation trends and extreme weather events will have a negative impact on the quality of water:

- The expected variation in precipitation trends will increase the risk of floods, especially flash floods
- Declining groundwater levels might affect the availability and quality of drinking water for communities that depend on them
- In periods of drought less flow will enhance eutrophication and can trigger toxic algal bloom. Additionally, pollutants that originate from point and diffuse sources might be less diluted, increasing concentrations of dangerous and emerging substance.

CARPATHIAN CONVENTION

UNEP

The Carpathian Convention and climate change

The activities of the working group on Climate change and adaptation:

- **FUTURE IMPERFECT** – Climate change and adaptation in the Carpathians, a publication bringing on CARPATCLIM, CARPVIA and CarpathCC
- **Joint Alpine-Carpathian Statement on Local Adaptation to Climate Change**, UNFCCC COP 20 in Lima , Czech and Italian Presidencies - Local Adaptation Platform, DRR
- Presence at Danube Annual Forum
- Ecosystems Based Adaptation

CARPATHIAN CONVENTION

CARPATCLIM Climate of the Carpathian Region

Carpathcc CLIMATE CHANGE IN THE CARPATHIAN REGION

CARPVIA CARPATHIAN INTEGRATED ASSESSMENT OF VULNERABILITY TO CLIMATE CHANGE AND ECOSYSTEM-BASED ADAPTATION MEASURES

UNEP

Thank you for your attention!

Harald Egerer

Head

Secretariat of the Carpathian Convention- UNEP Vienna

harald.EGERER@unvienna.org

www.carpathianconvention.org

www.unep.org/roe

UNEP

CARPATHIAN CONVENTION