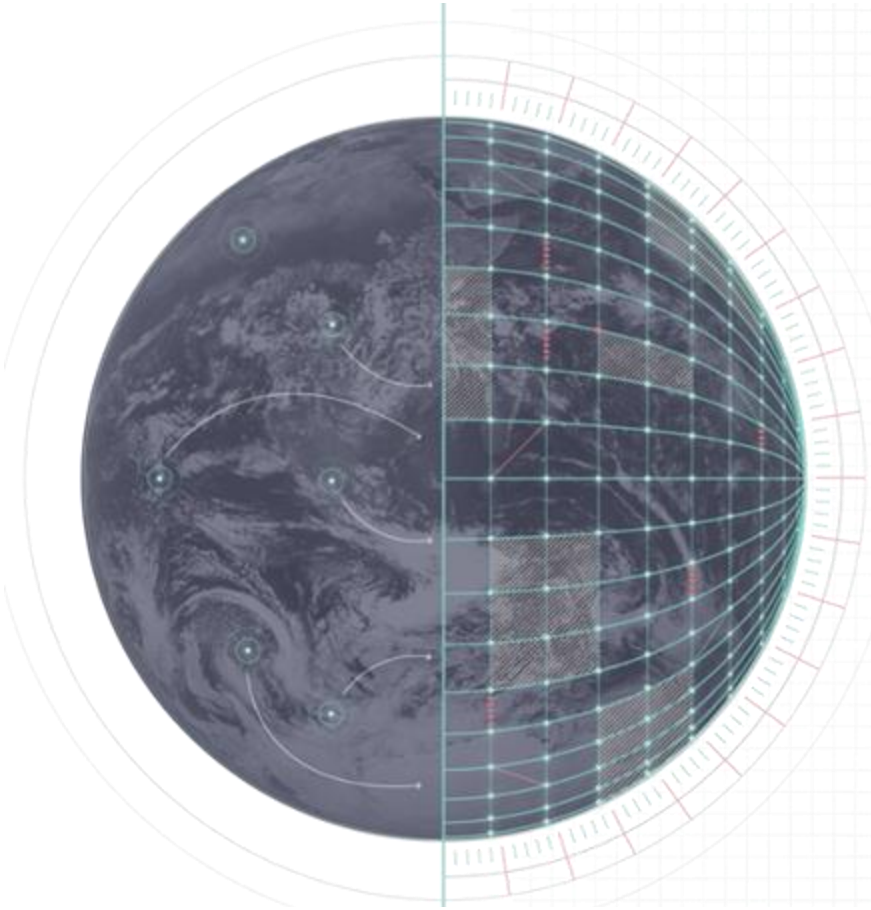


UFZ HELMHOLTZ Centre for Environmental Research

DESTINATION EARTH

IMPROVING DRM FOR HYDROLOGIC EXTREMES ON CLIMATE TIMESCALES

Aparna Chandrasekar

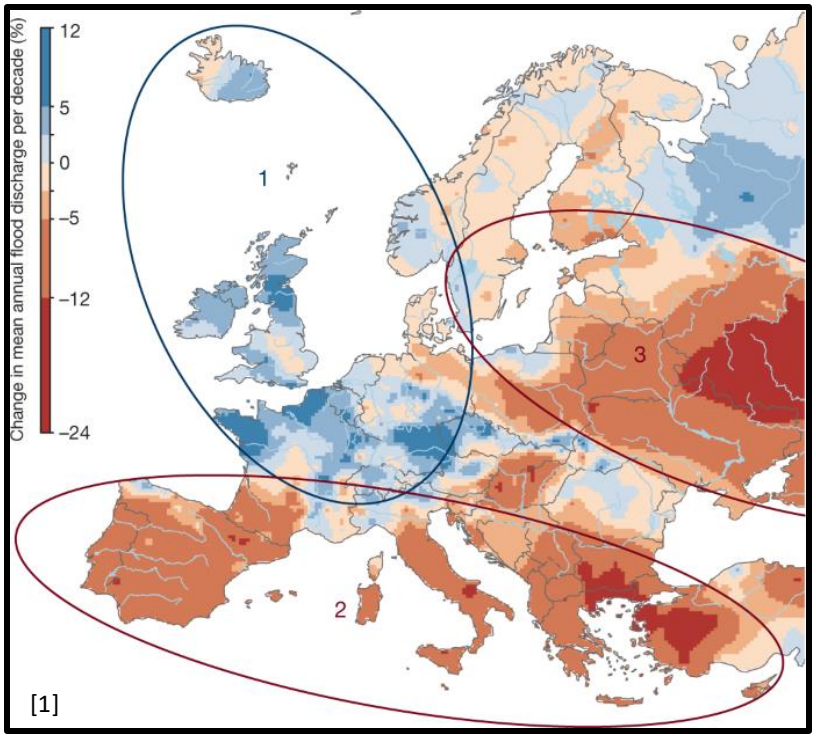
Stephan Thober

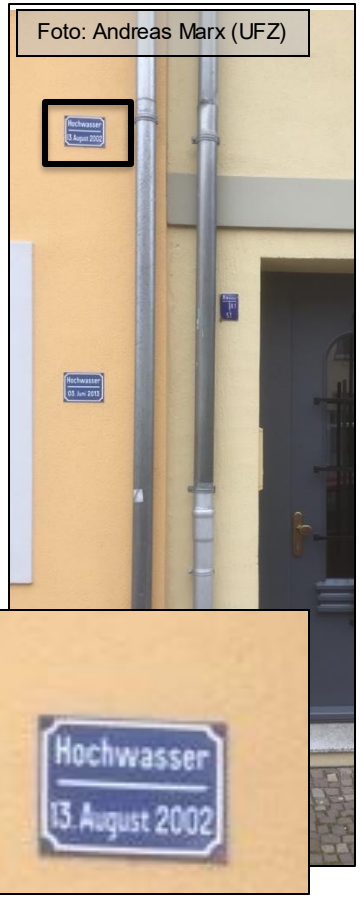
ClimateDT Team

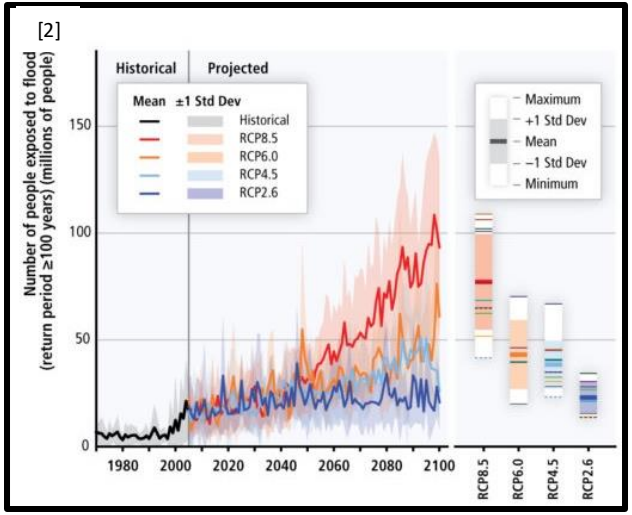
Funded by the European Union

Destination Earth implemented by ECMWF esa EUMETSAT

HYDROLOGY AND DISASTER PREPAREDNESS



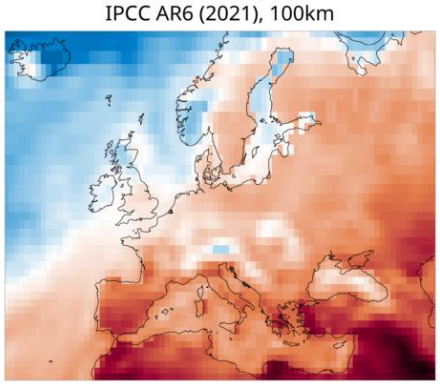


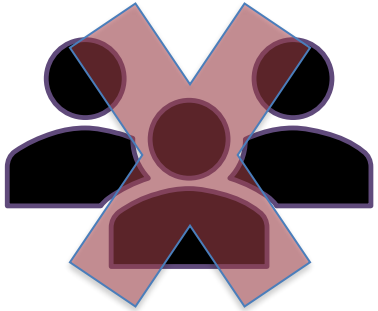


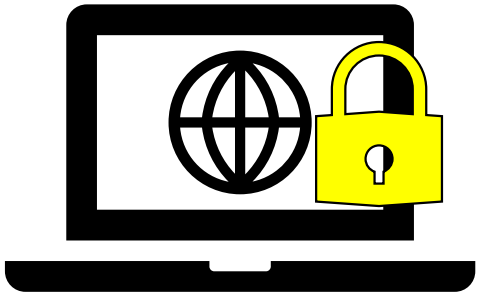
[1] Blöschl, *et al.* Changing climate both increases and decreases European river floods. *Nature* **573**, 108–111 (2019). https://doi.org/10.1038/s41586-019-1495-6
[2] Intergovernmental Panel on Climate Change. (2014). *Figure TS.6, Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (p. 69). Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/WGII_AR5_FigTS-6.jpg

HOW CAN HIGH RESOLUTION INFORMATION IMPROVE DISASTER PREPAREDNESS IN HYDROLOGY

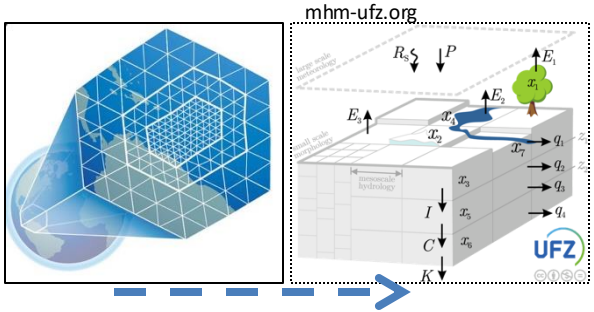
Current gaps



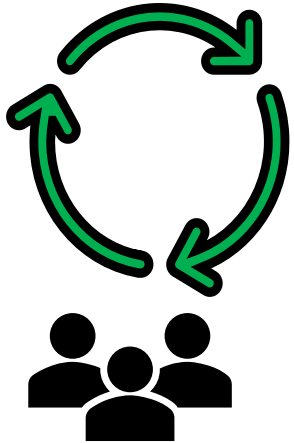




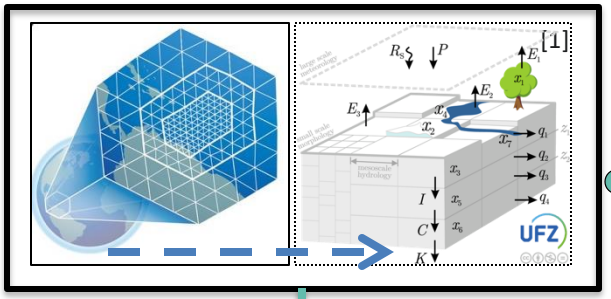
Solutions



Streamed

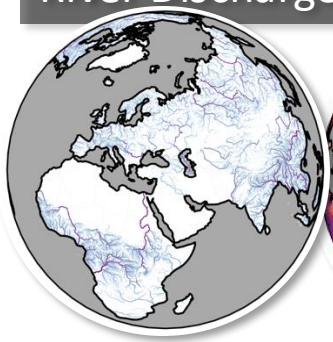


HYDROLAND – A CLIMATE DT APPLICATION IN THE DESTINATION EARTH INITIATIVE

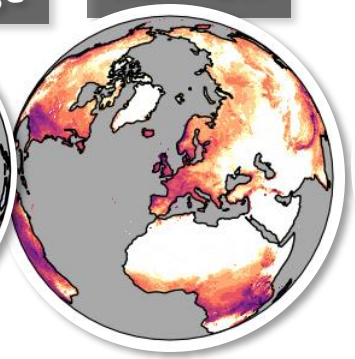


What-if- scenarios *policy impact*

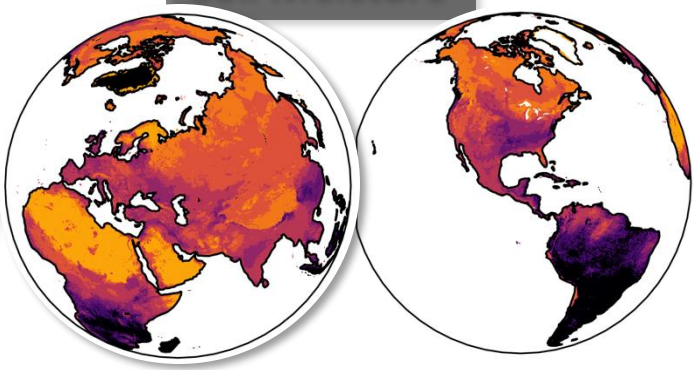
River Discharge



Run- off



Soil Moisture



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ECMWF

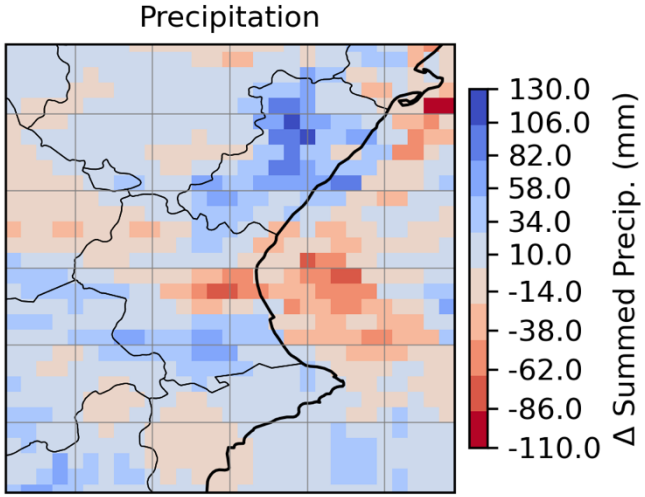
[1] Samaniego, L., R. Kumar, and S. Attinger (2010), Multiscale parameter regionalization of a grid-based hydrologic model at the mesoscale, *Water Resour. Res.*, 46, W05523, doi:10.1029/2008WR007327.

EFFECT OF 2°C WARMING ON FLOODS

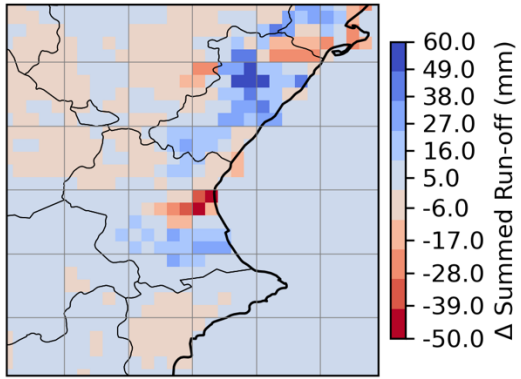
https://www.dailymail.co.uk/news/article-14025789/Horror-Spain-flood-map-shows-worst-hit-areas-amid-apocalyptic-natural-disaster-warnings-issued-Valencia.html

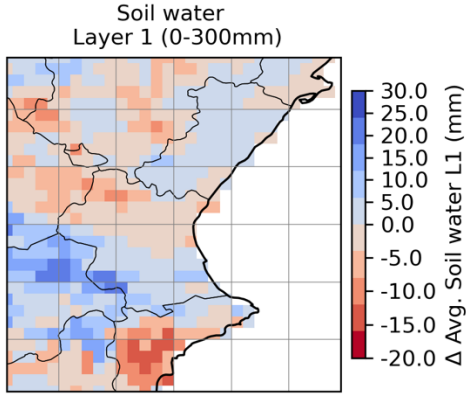
The flood as it occurred

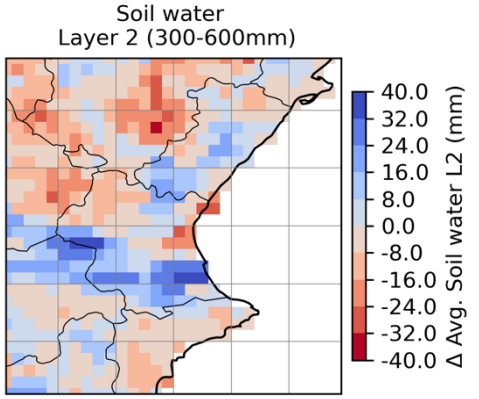
Absolute difference in precipitation in a 2°C warmer world



Change in flood impacts in a 2°C warmer world



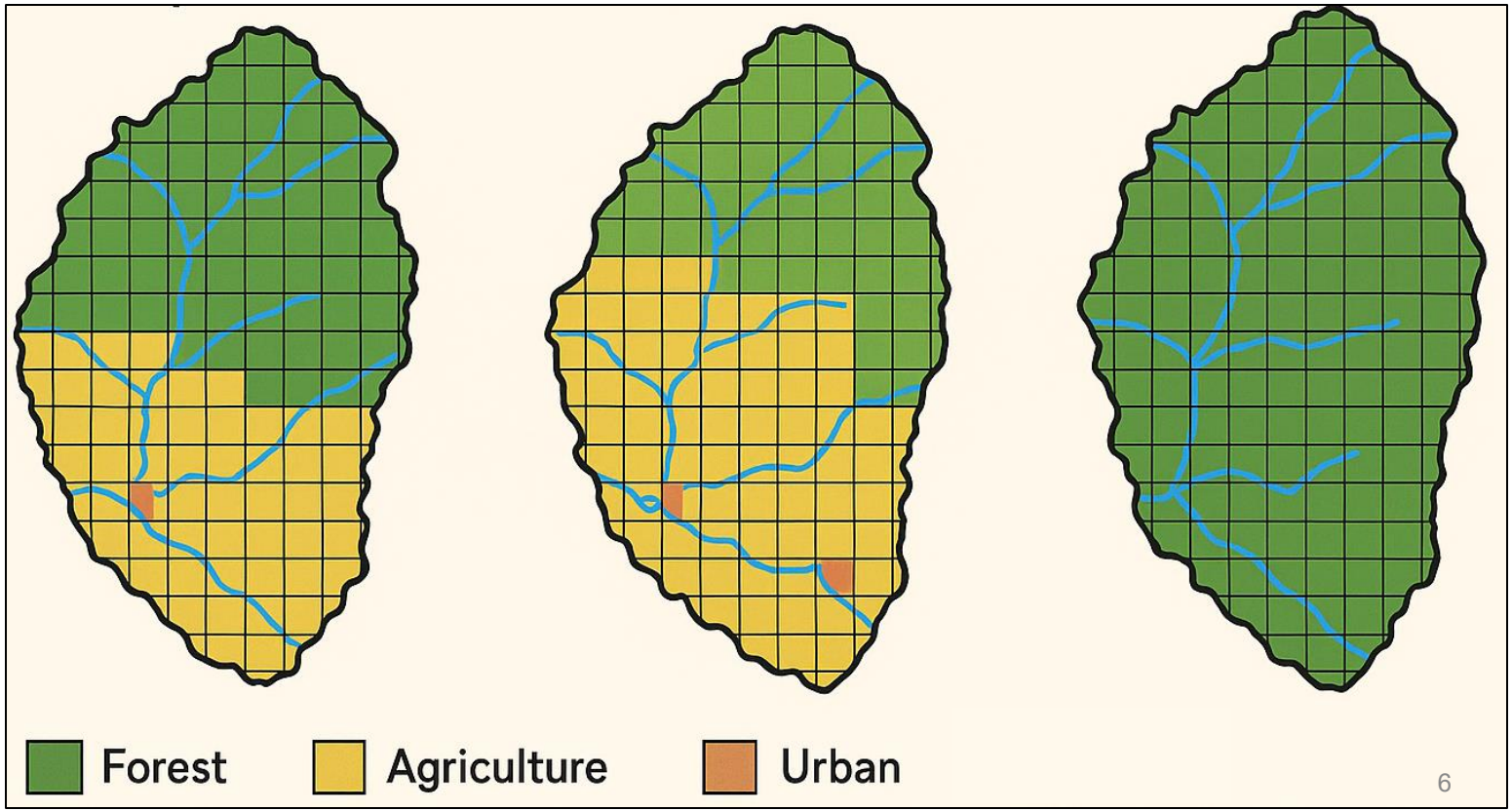




ECMWF

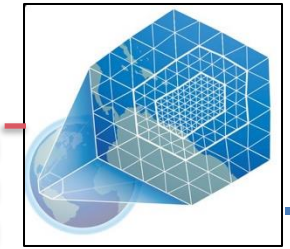
POTENTIAL WHAT-IF SCENARIO USE CASE

How does changes in forest cover in the black forest mountain region in Germany impact surface run off?

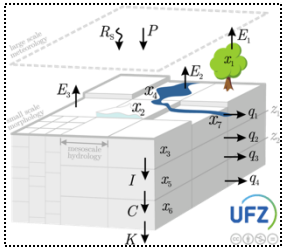


WHAT-IF SCENARIOS AND AI IN THE HYDROLAND APPLICATION

Spatial resolution: 5 km
Temporal resolution: 1 hour
Global dataset

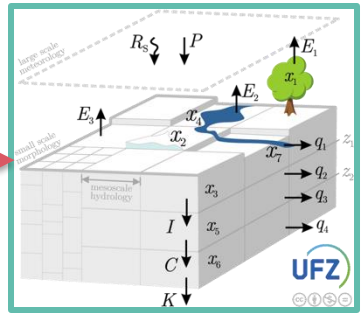


AI to improve data processing In workflow



What-if-scenarios

policy impact



Use AI to understand trends in increase in population or create socio-economic scenarios for better local impact assessment

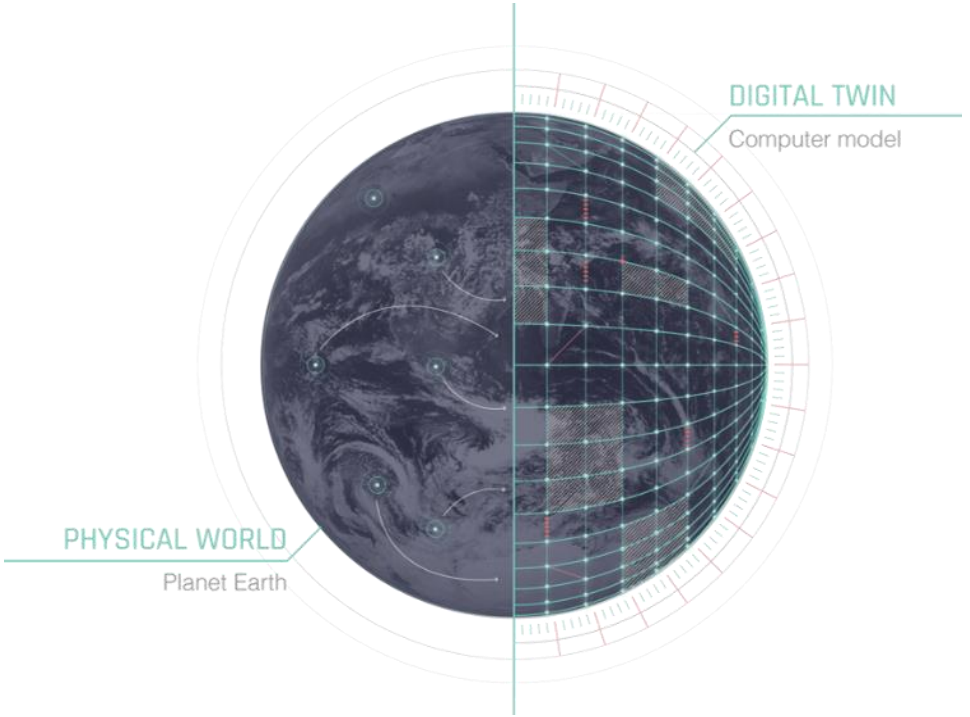
KEY TAKEAWAYS

- **HydroLand delivers high-resolution hydrology data** at a global scale—5 km spatial and hourly temporal resolution—setting a new benchmark in climate services.

- **Co-designed with end users**, including water suppliers and environmental agencies, HydroLand empowers stakeholders to build and test policy scenarios directly within the platform.

- **Custom climate indicators** are developed through collaboration with users, enabling more targeted and relevant assessments of climate change impacts.

- **AI-enhanced processing** improves data realism and integrates dynamic impact assessments, leading to more actionable insights for decision-making.



CONTACT AND FURTHER INFORMATION

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stephan.thober@ufz.de

Destination Earth:
www.ecmwf.int/destine

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