

WATER and CLIMATE

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„People and Water“, NGO, Slovakia



People, Planet and Water
Tunis, March, 25th 2015

THE LARGE AND SMALL WATER CYCLES

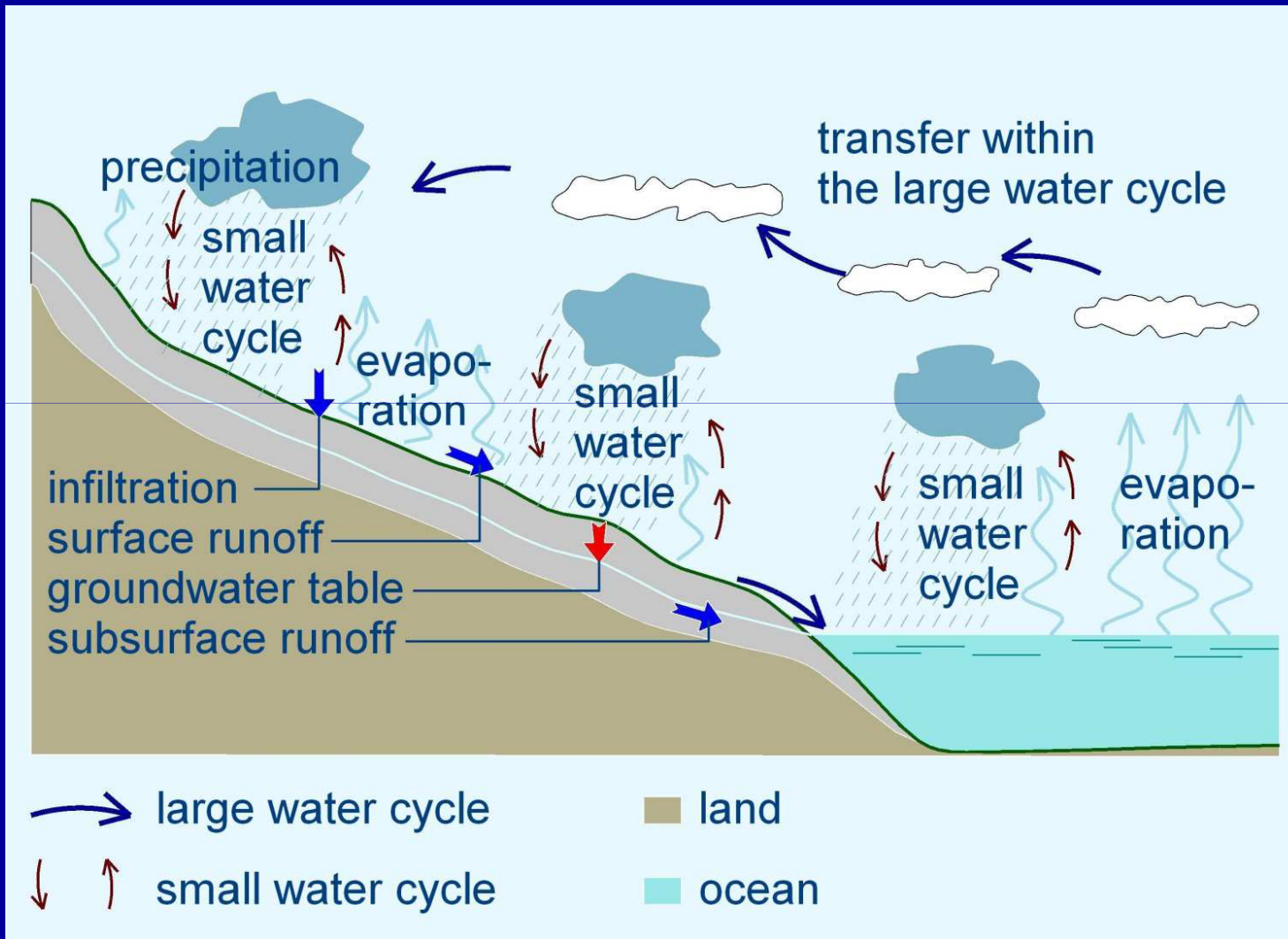
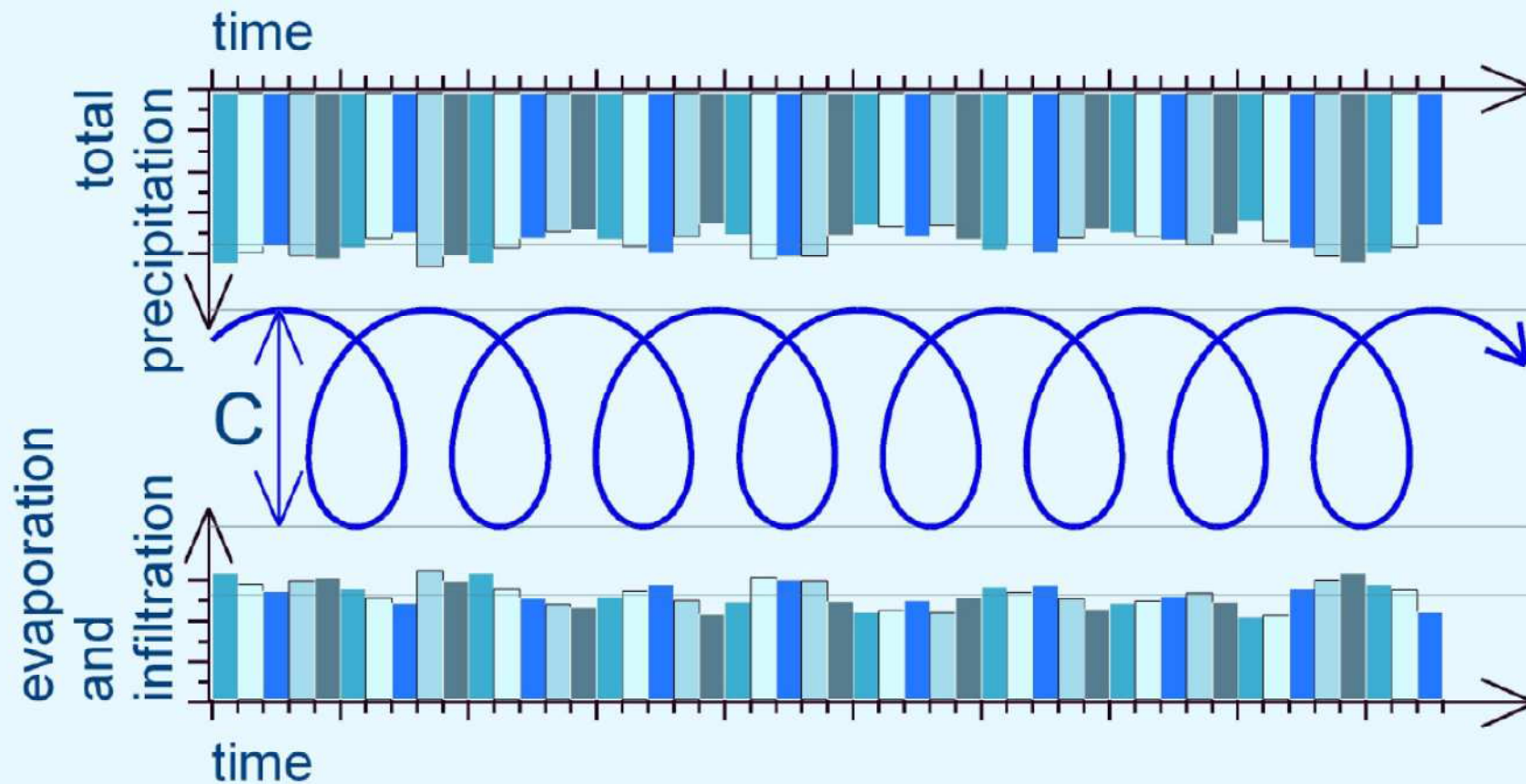


Diagram of the long-term stable water cycle on land



C - diagram of the circulation of water on land

SOIL SEALING IN CITIES

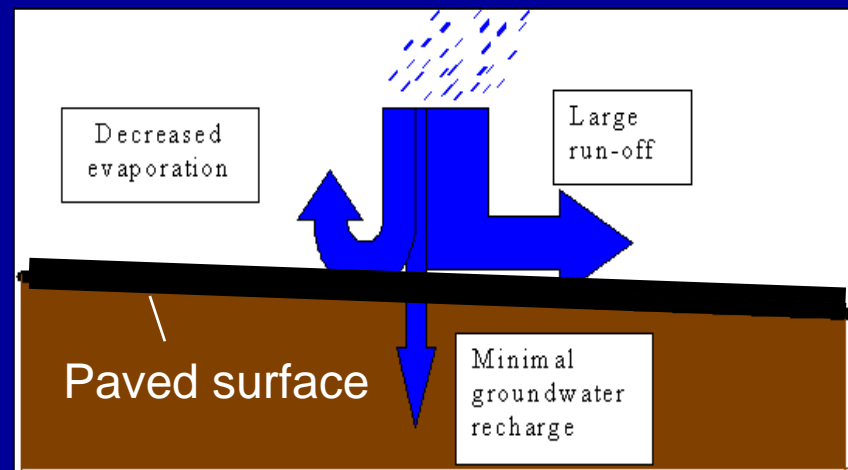
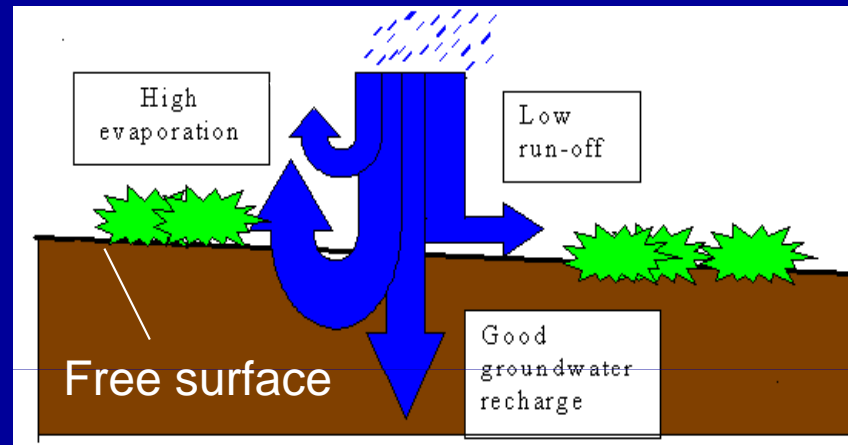




SPAIN – TARAGONA, 2008



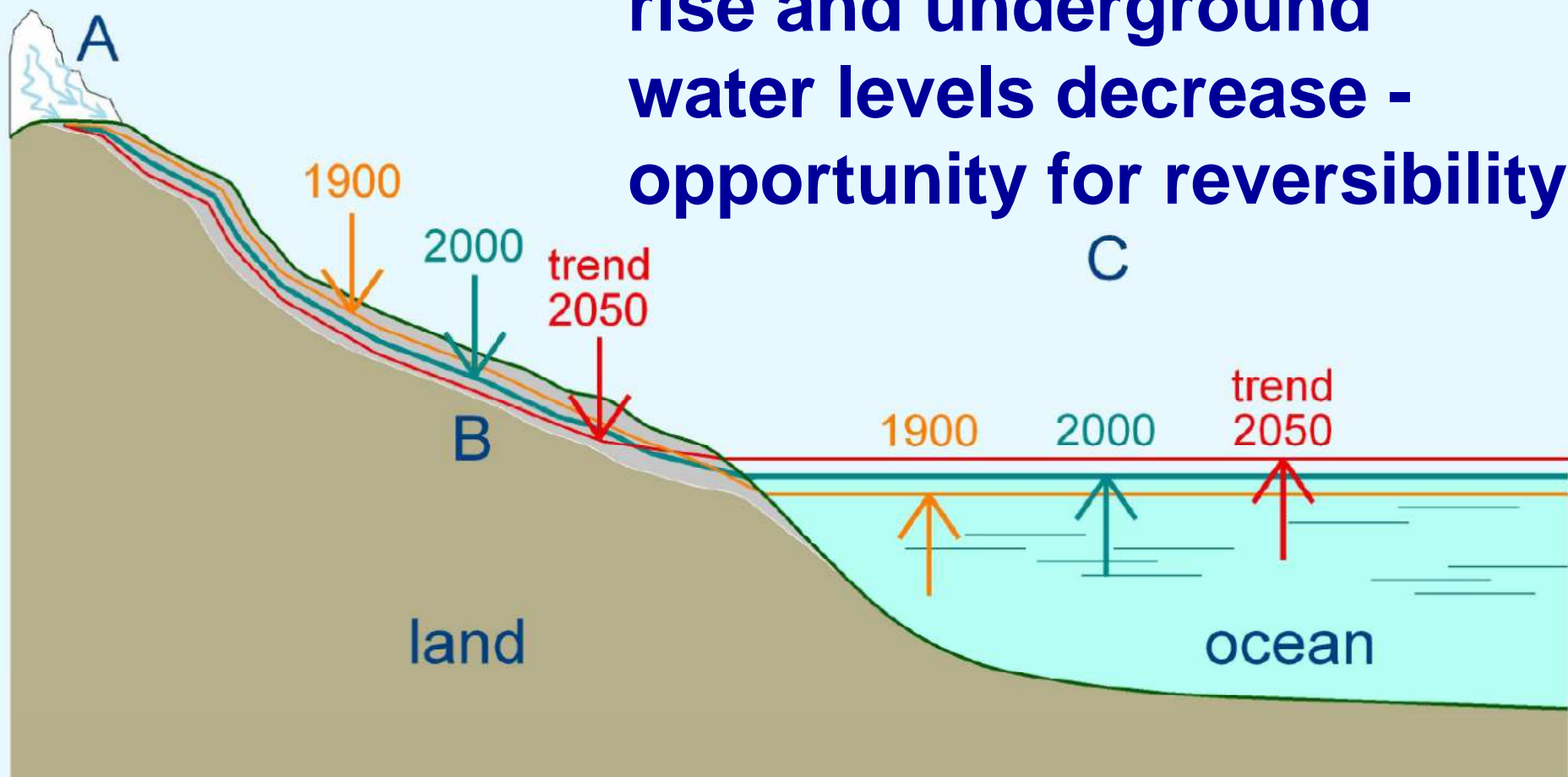
Impact of deforestation, agriculture and urbanization:



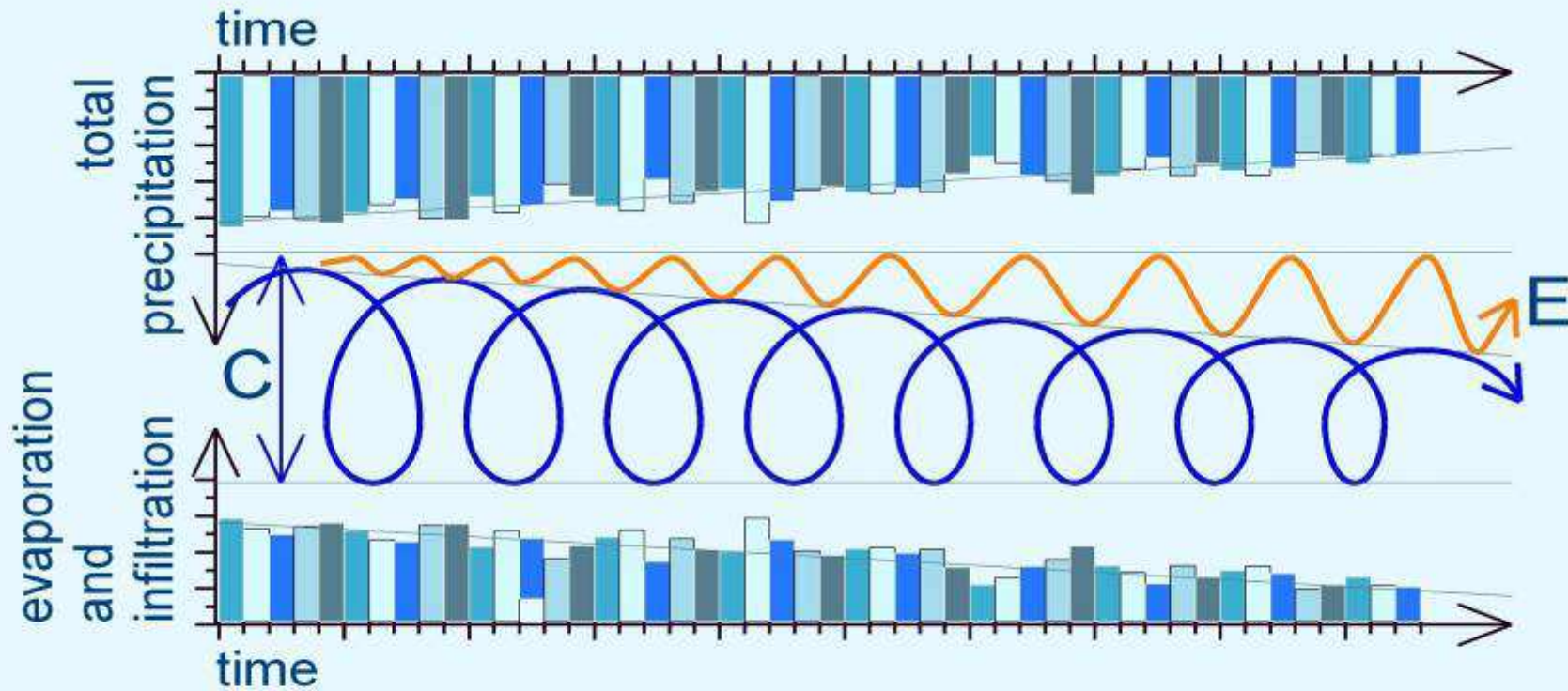
1. infiltration and evaporation decrease runoff increases
2. about 40 billion m³ of rainwater canalized from European urban spaces annually
3. globally 700 billion m³ of rainwater canalized from the continents annually to the sea

The impact of glaciers melting (A) and the decline in the reserves of water on the continents (B) on rising ocean levels (C)

Direct relation of sea level rise and underground water levels decrease - opportunity for reversibility



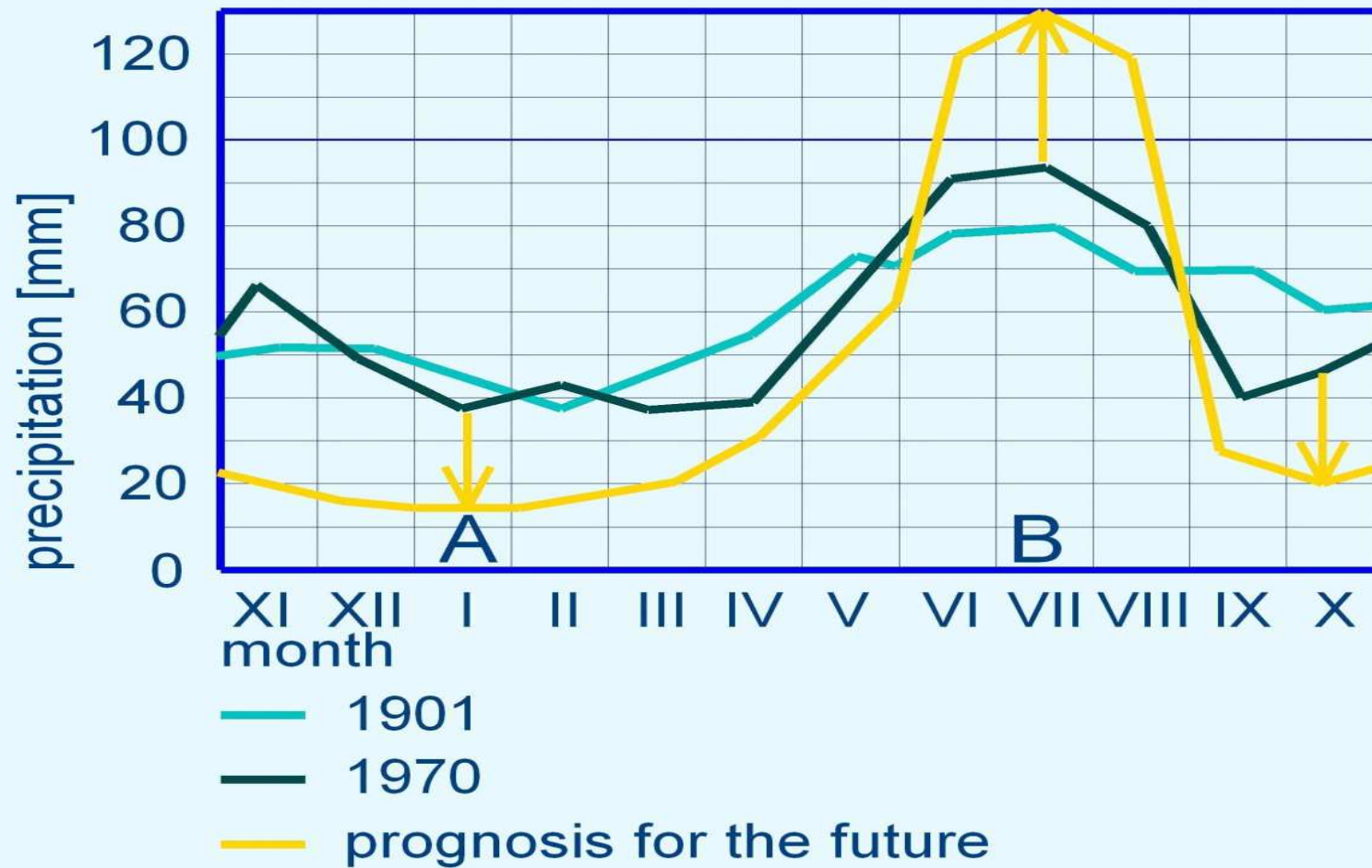
GROWTH OF EXTREME WEATHER WITH DECLINE OF SHORT WATER CYCLE



C - diagram of the circulation of water on land

E - diagram of extreme weather events

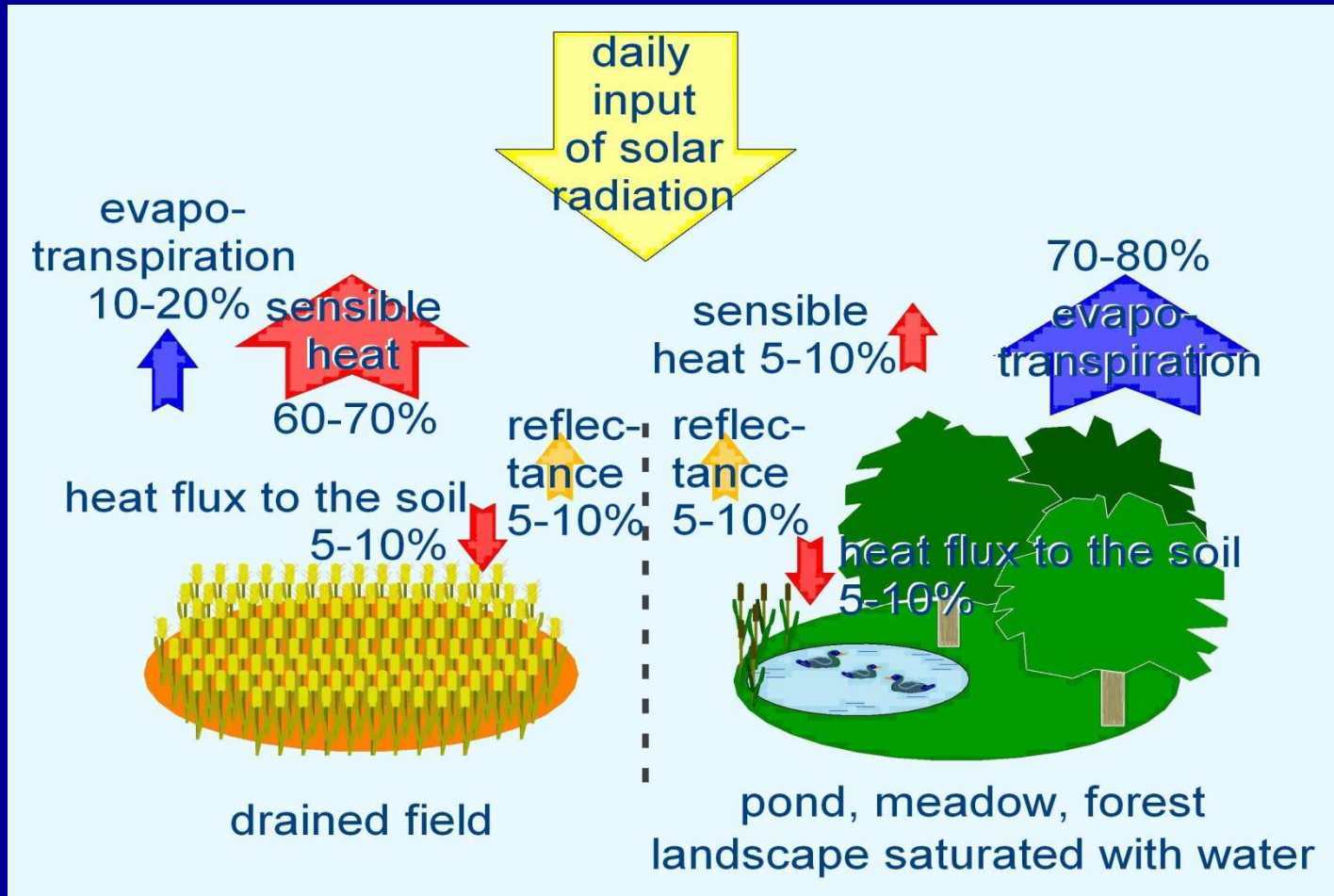
PRECIPITATION TRENDS IN SLOVAKIA





**OLD PARADIGM OF
RAINWATER MANAGEMENT
IMPACT ON ENERGY
SYSTEM PLANET EARTH**

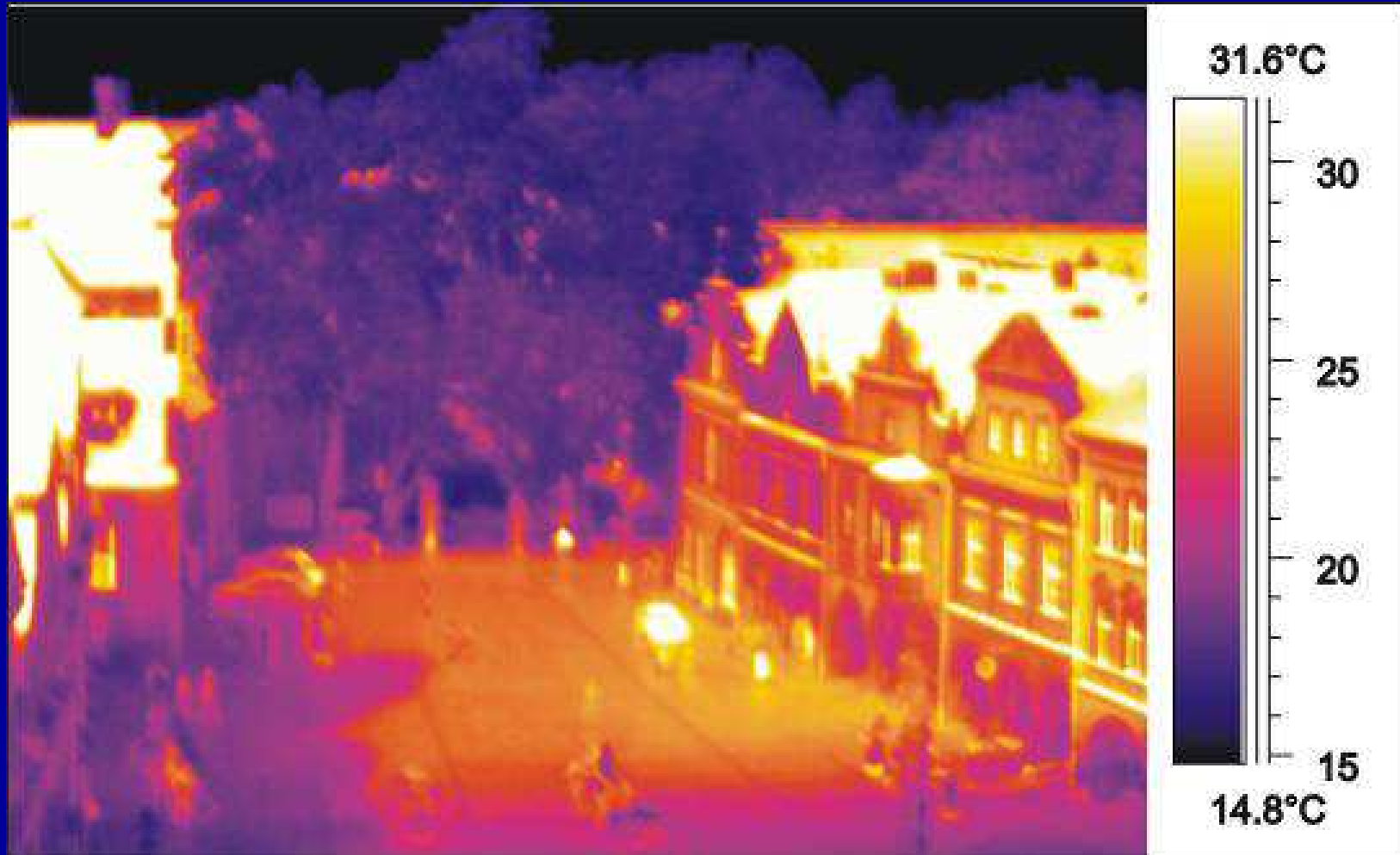
DISTRIBUTION OF SOLAR ENERGY



Dry land: Most solar energy is dissipated into *sensible heat*,

Wet land: most solar energy is consumed in phase change

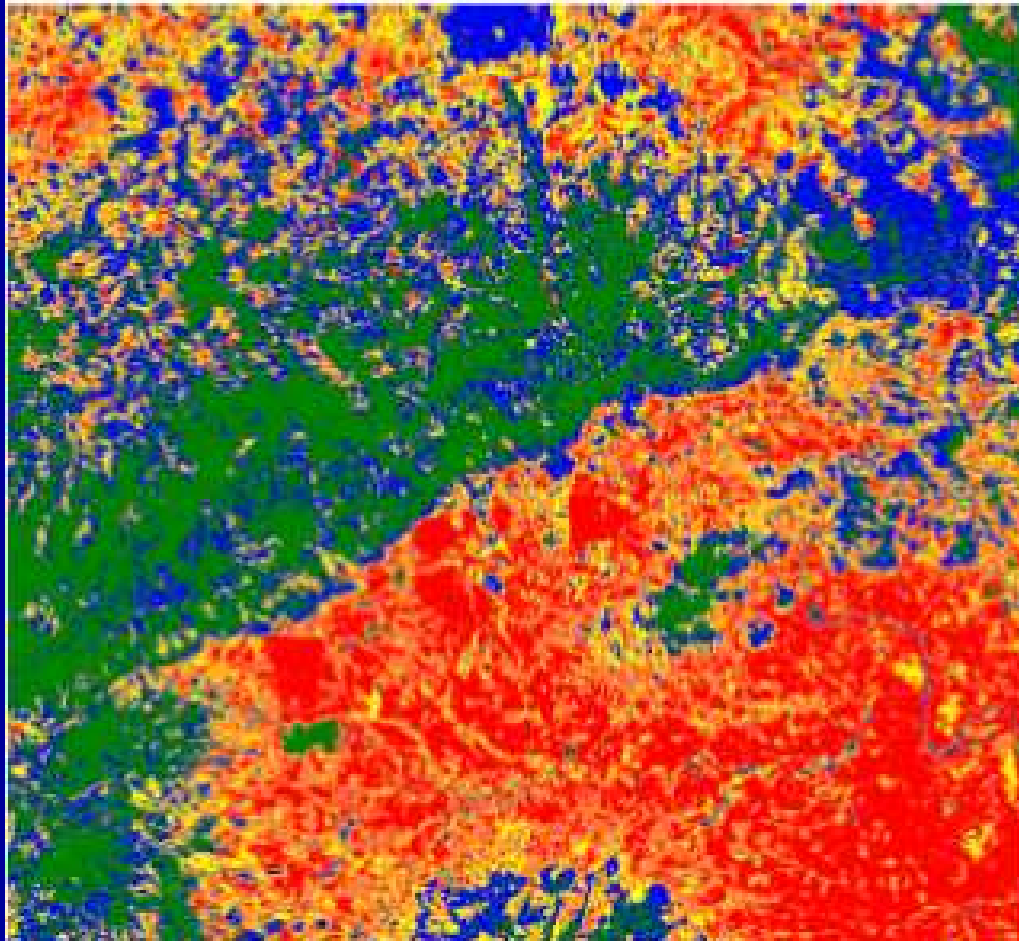
PHOTO OF A CITY SQUARE - INFRARED CAMERA



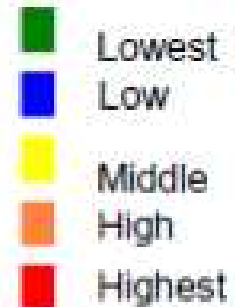
The cooling effect of evapotranspiration is much stronger in comparison with the effects of reflectance.

LAND COVER DETERMINES TEMPERATURE DISTRIBUTION

Radiation temperature of land cover
– relative scale



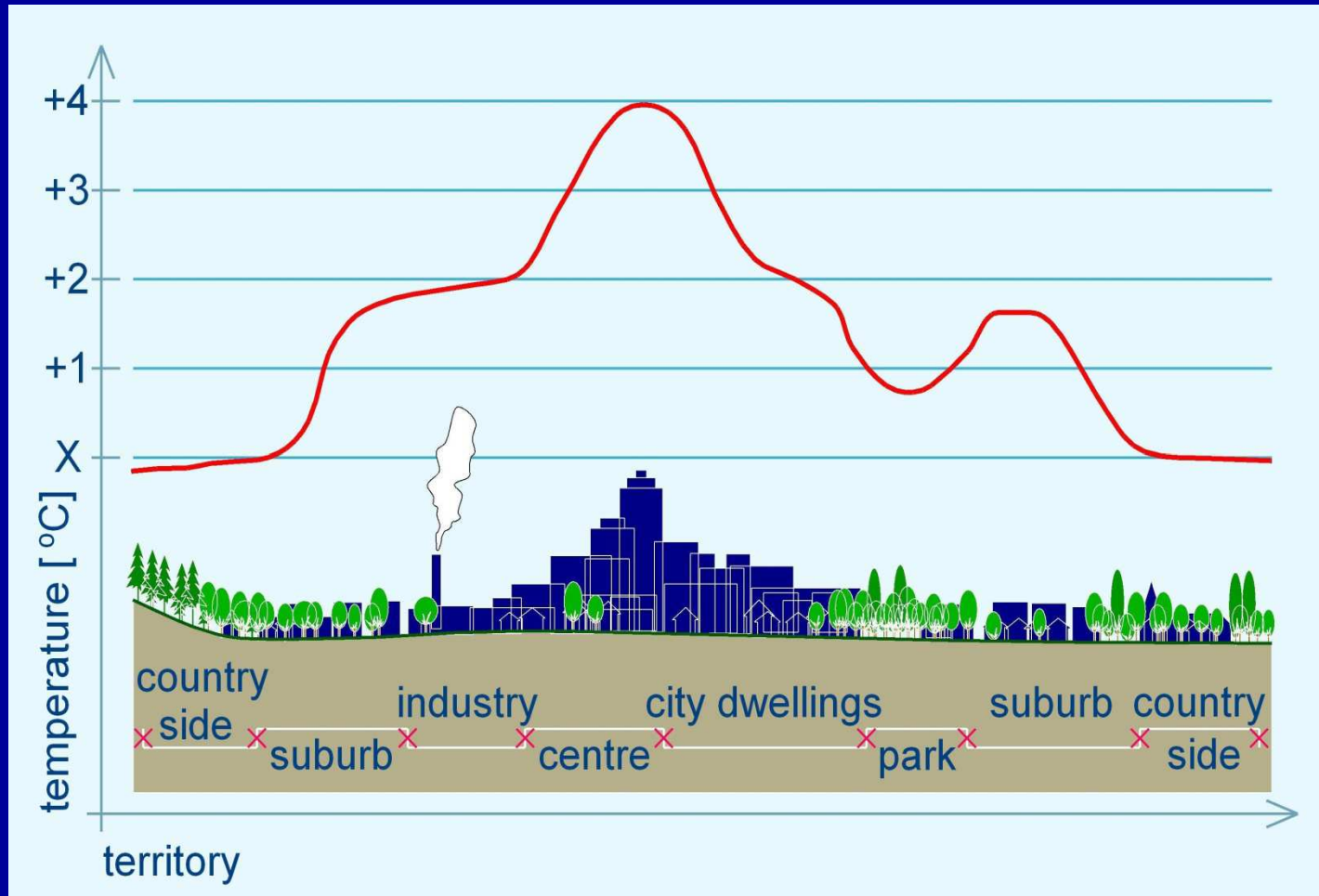
Temperature:



(North Bohemia,
East Germany
/Saxony,

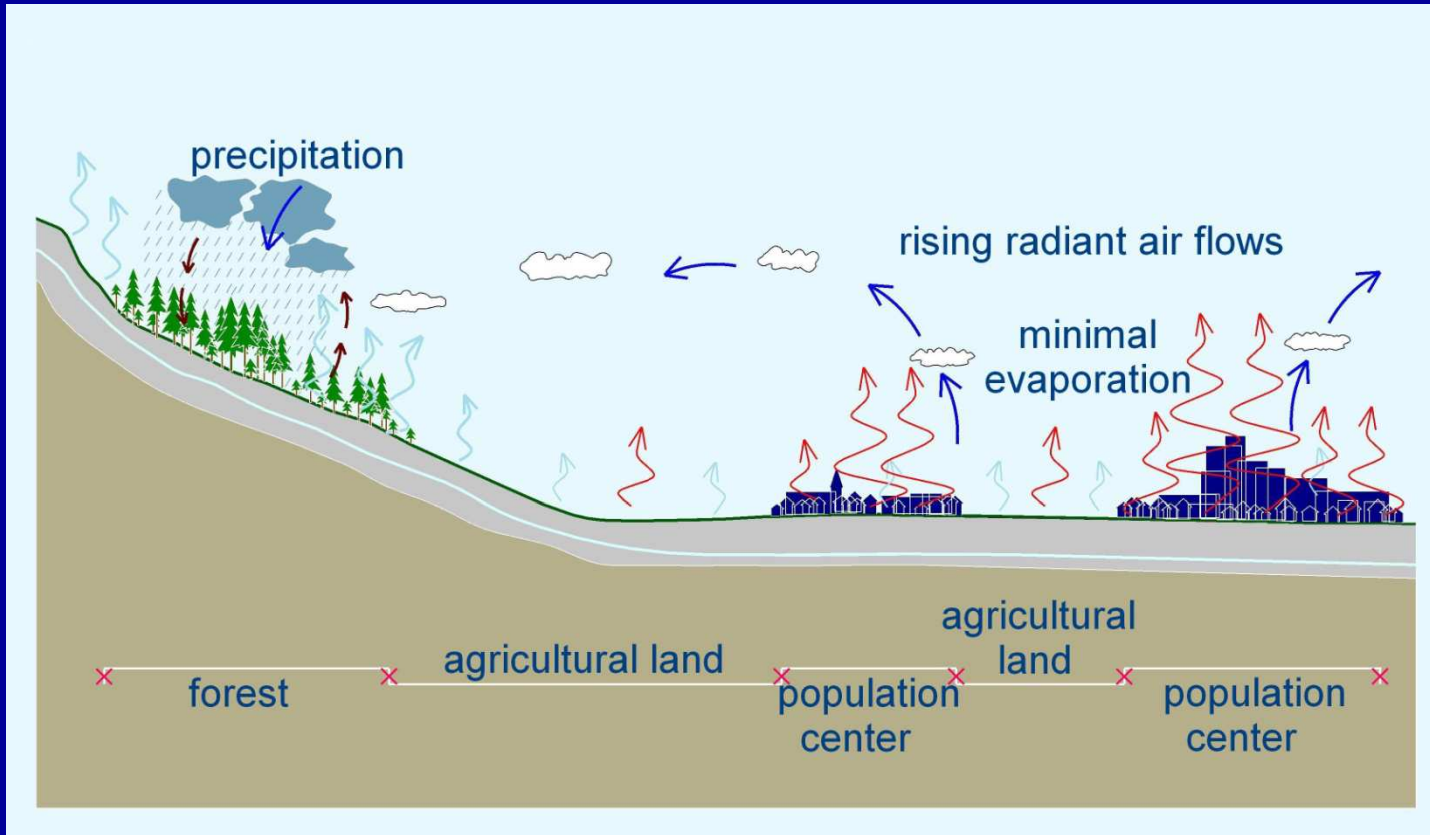
approx.
100 x 85 km)

HOT CLIMATIC UMBRELLA OF A CITY



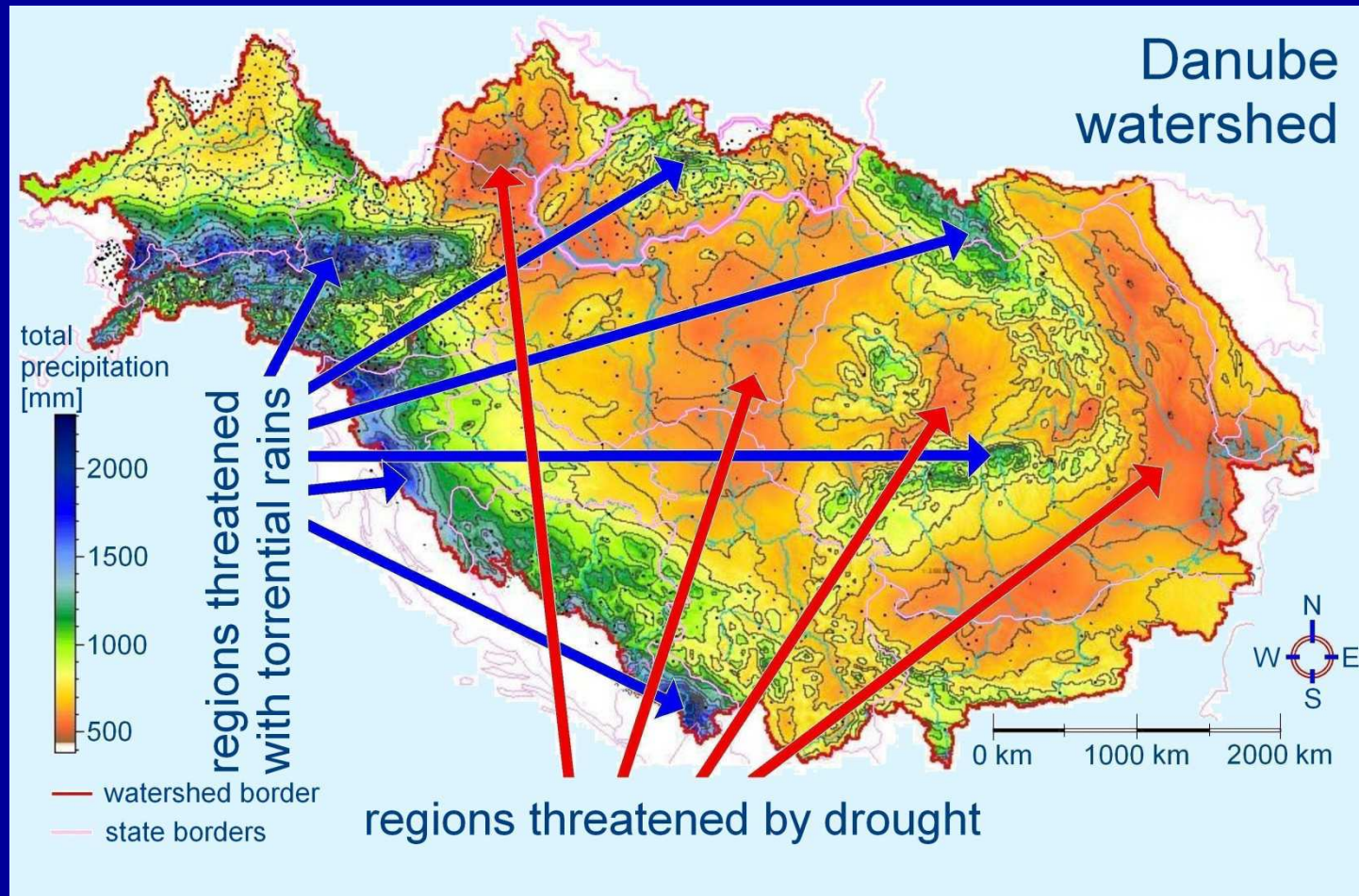
Soil sealing resulting in the lack of evapotranspiration in urban areas is the main reason of “urban heat island” effects.

IMPACTS ON WEATHER /CLIMATE



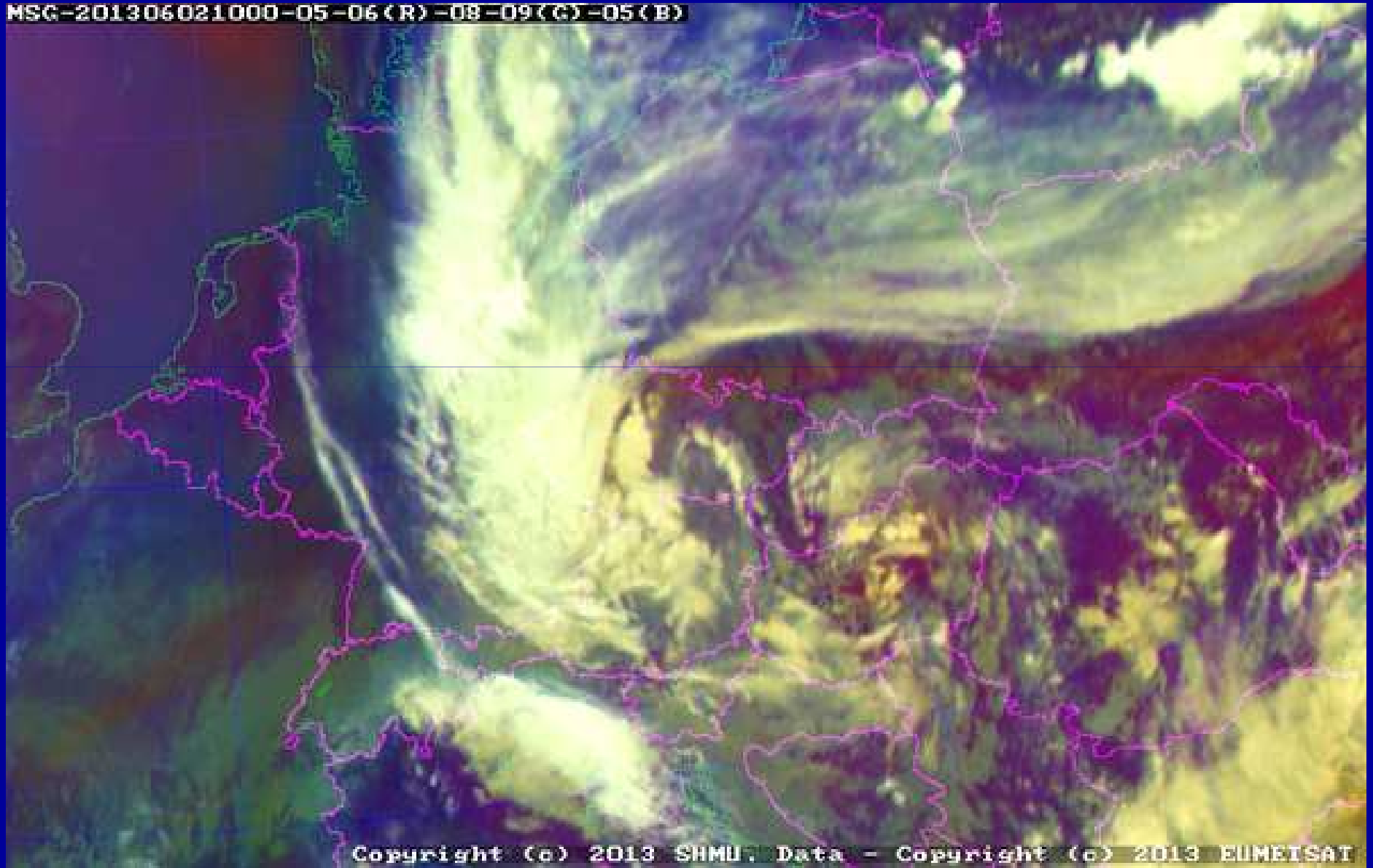
- Rising air flows push rain to colder areas
- Frequency of droughts and floods increases

PRECIPITATION IN MOUNTAINS AND LOWLANDS – DANUBE WATERSHED



Central Europe 2012

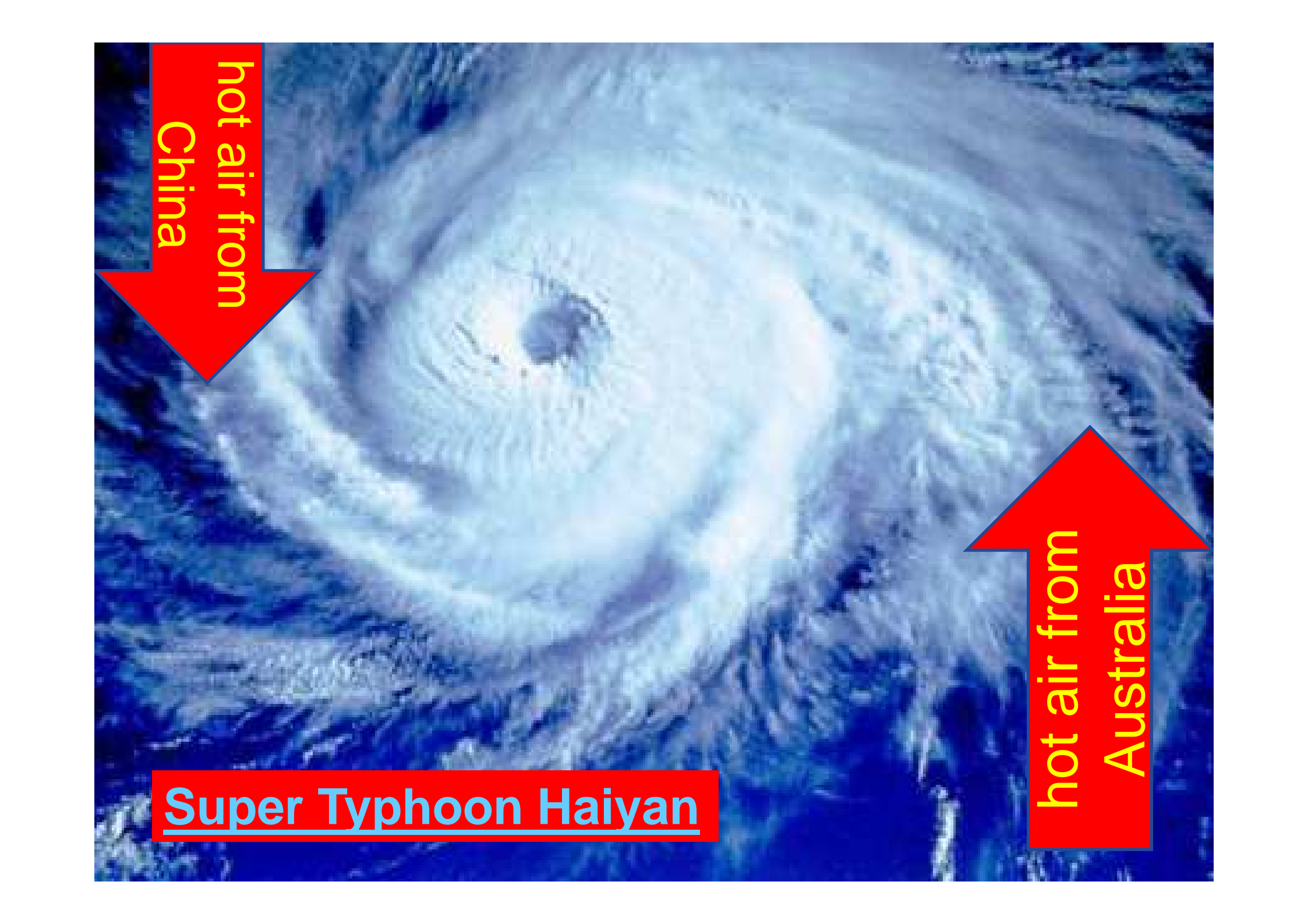
MSC-201306021000-05-06 (R) -08-09 (G) -05 (B)



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CYPRUS CASE

A satellite image of Super Typhoon Haiyan, showing a well-defined eye and spiral cloud bands. Two red arrows point towards the center of the storm. One arrow points from the top-left, labeled 'hot air from China'. The other arrow points from the bottom-right, labeled 'hot air from Australia'.

hot air from
China

hot air from
Australia

Super Typhoon Haiyan

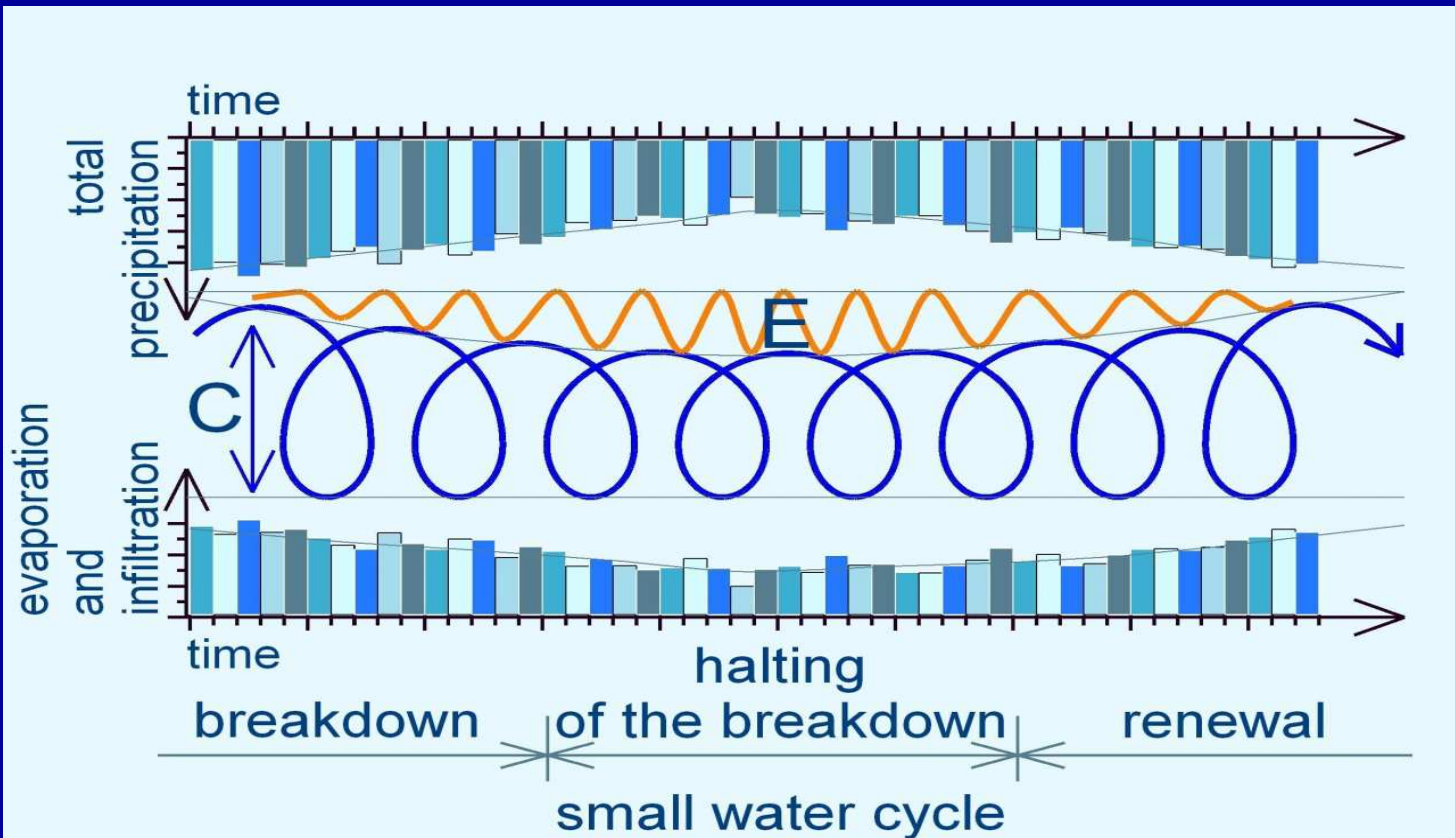
SUPER STORM SANDY



RECOVERY

OF THE CLIMATE

The destruction and renewal of the small water cycle



C - diagram of the circulation of water on land

E - diagram of extreme weather events

NEW WATER DEAL

more clouds



more soft rain

more air humidity

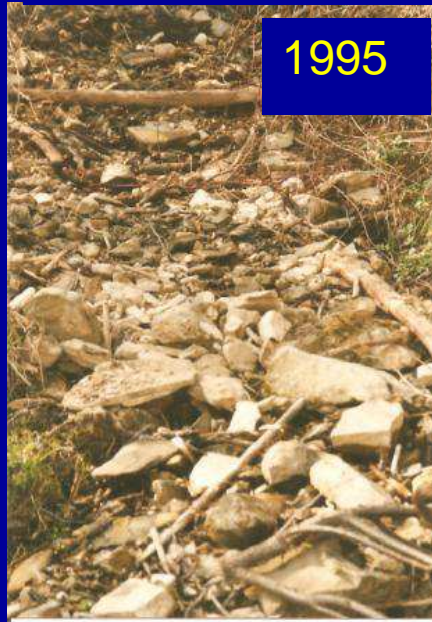


more evaporation from lands

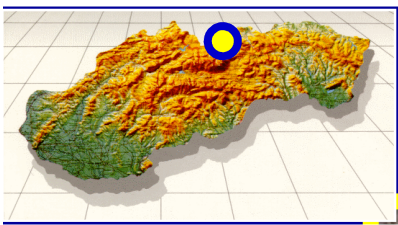
more vegetation and biodiversity

more groundwater recharge

Blue Alternative (People and Water, 1995)



WATER FOREST, High Tatras, (People and Water, 2005)



2005



2005



2007

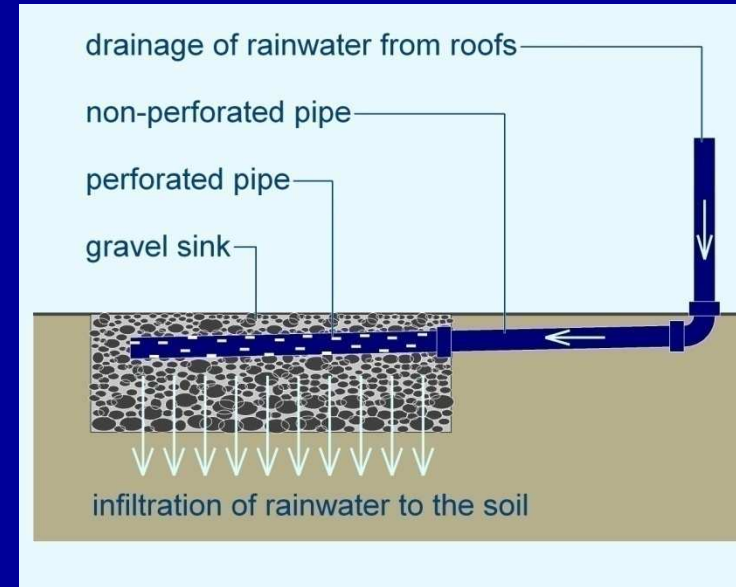


2008

RAINWATER HARVESTING IN URBAN ZONE

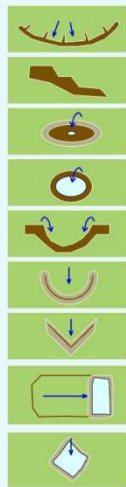


RAINWATER HARVESTING

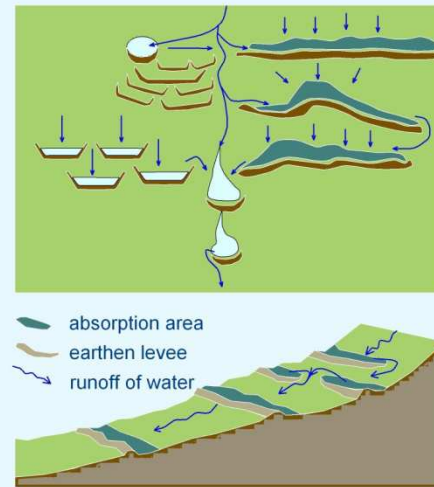


Microstructures for the rainwater harvesting on land

- Contoured barrages
- Terraces
- Eyebrow terraces
- Pits
- Vallerani-type microcatchments
- Semicircular bunds
- Triangular bunds
- Meskat
- Negarim



Combination of different rainwater harvesting technologies



PRECIPITATION, RUNOFF, EVAPORATION COOLING RATE OF GREEN ROOF PLOTS



WOTR INITIATIVE IN INDIA





Tamera, Portugal 2007



Water Retention Landscape, Tamera 2011

TAMERA INITIATIVE (PORTUGAL)



RAINWATER HARVESTING



TUNISIA RAINWATER HARVESTING ON AGROLANDS FROM YESTERDAY



BIOCLIMATIC GARDENS FOR RAINWATER HARVESTING AND EVAPOTRANSPIRATION

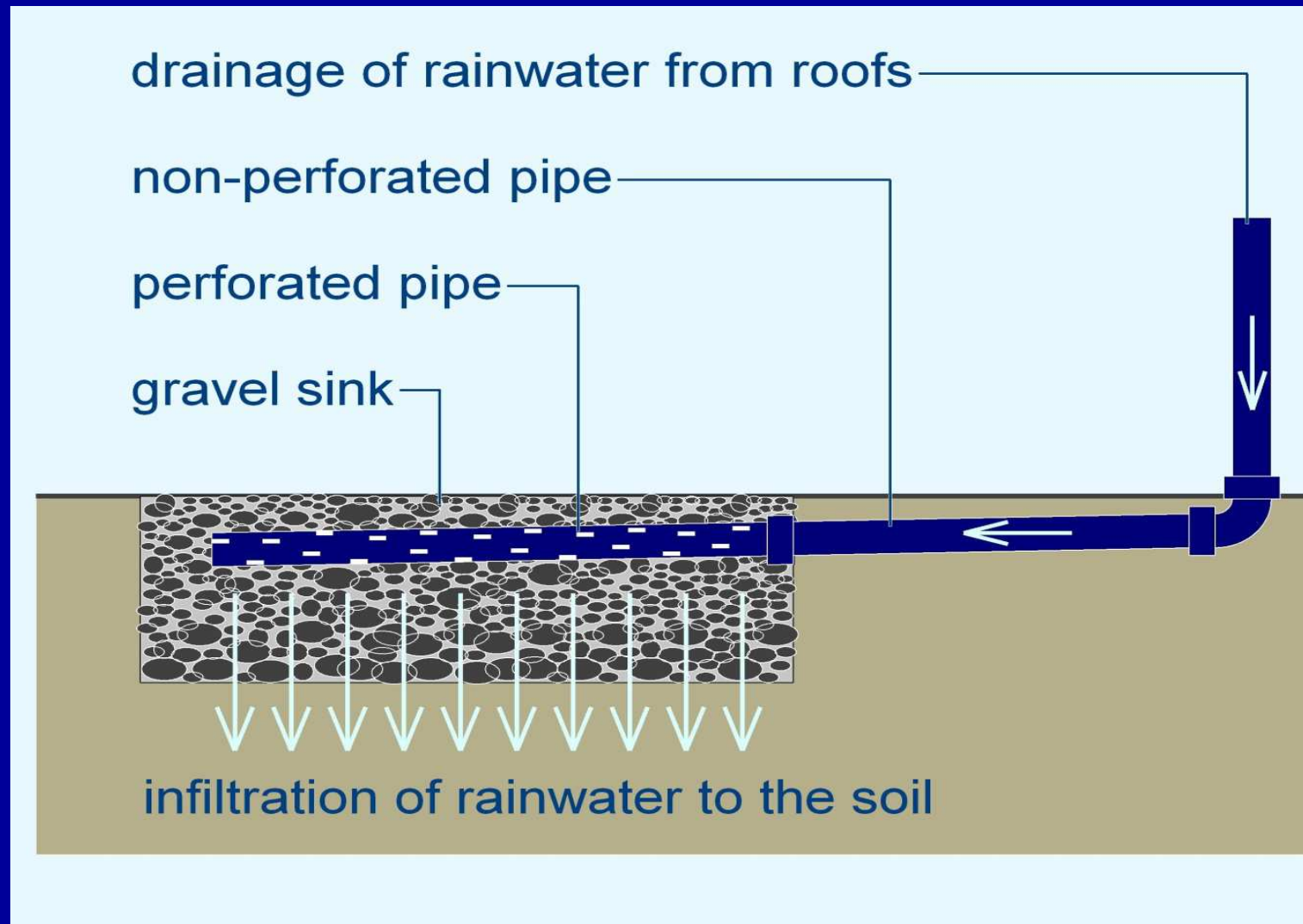




Schools, public buildings, roads, parking places

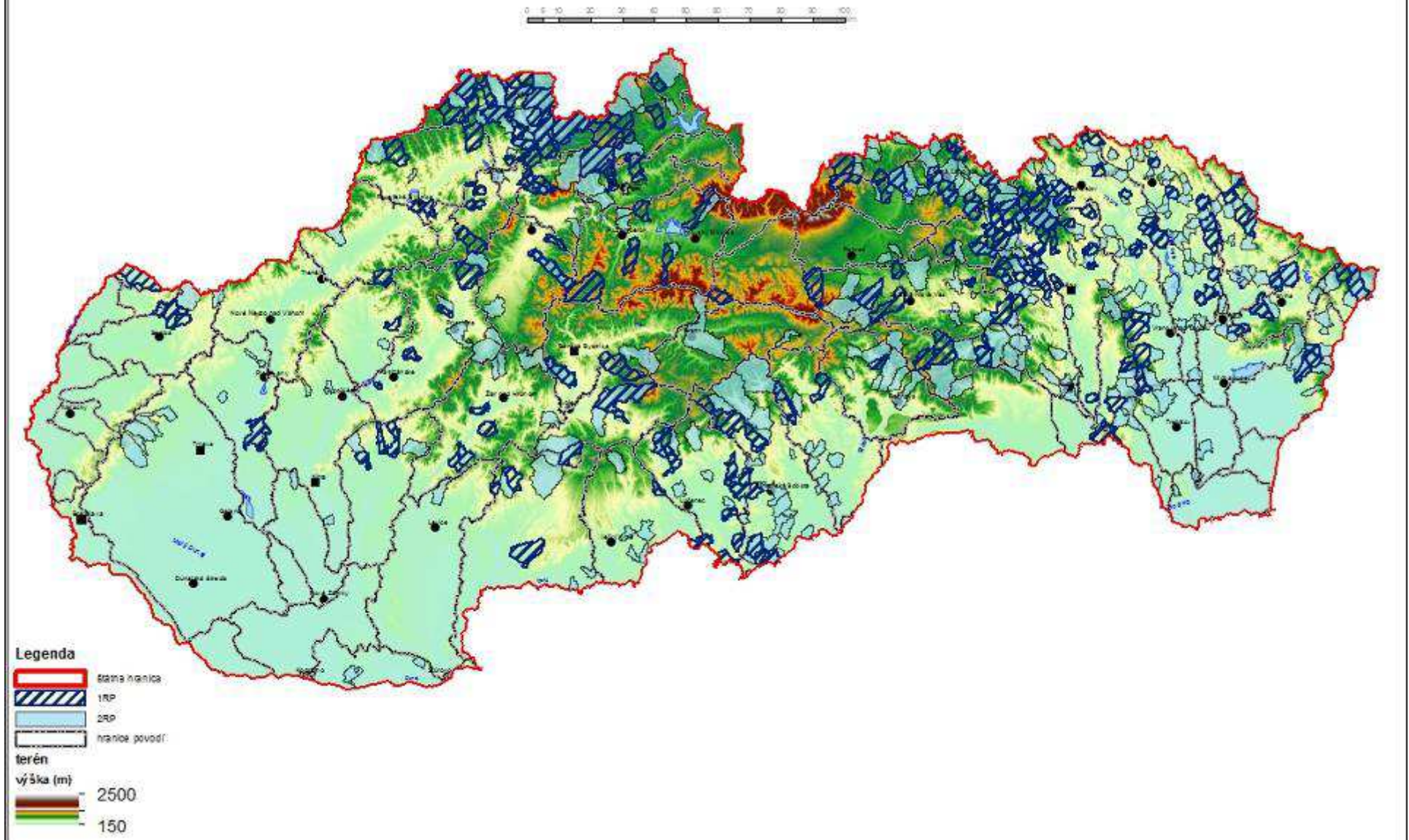


Rainwater harvesting from roofs in cities



**LANDSCAPE
RESTORATION
PROGRAM IN SLOVAKIA
2011**

480 towns and communities involved in the program in 2011



ŤAHANOVCE



Snežnica



Pčoliné

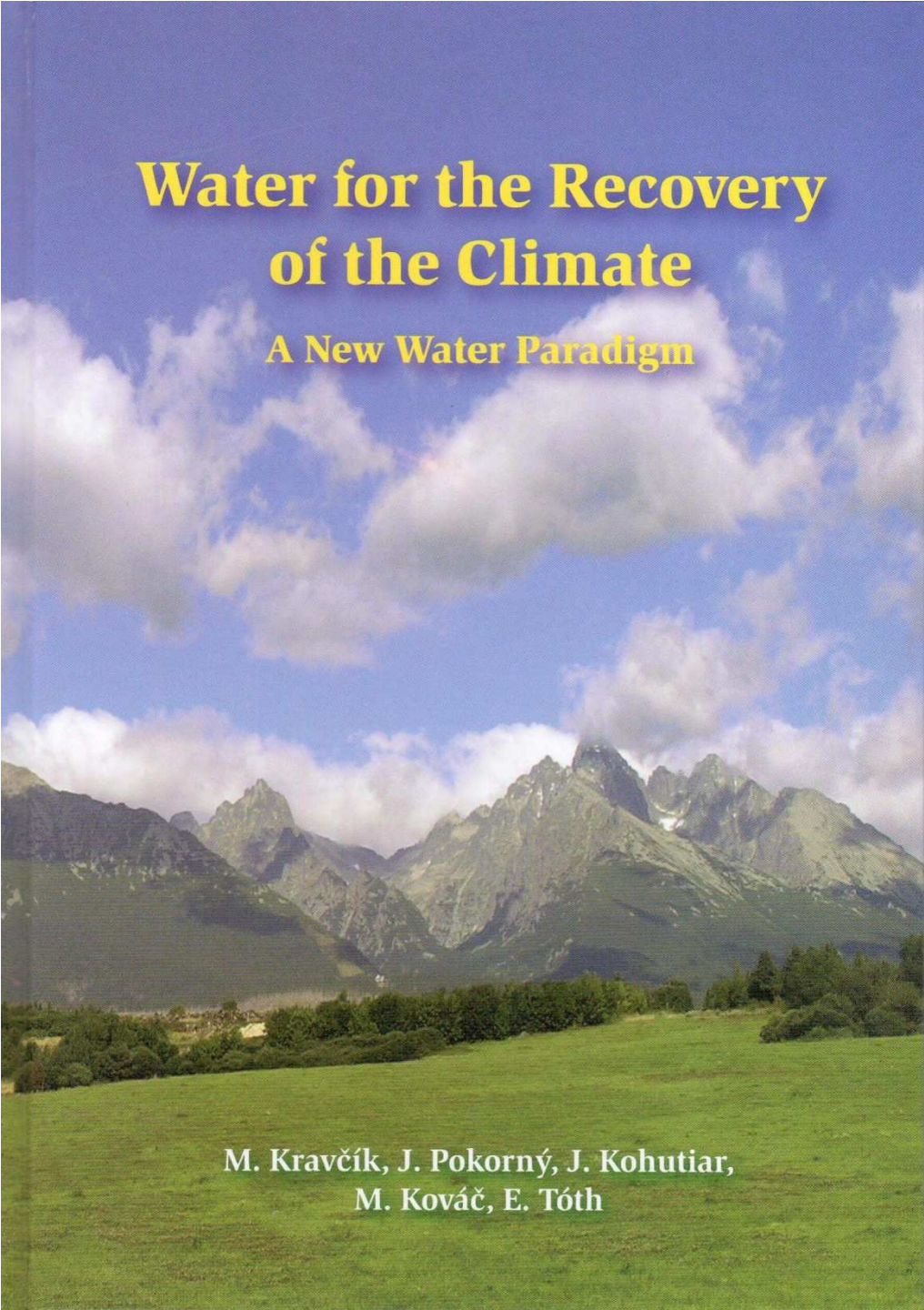


Hlohovec



Turcovce





Water for the Recovery of the Climate

A New Water Paradigm

M. Kravčík, J. Pokorný, J. Kohutiar,
M. Kováč, E. Tóth

- **humanity accelerates the runoff from land**
- **more solar energy is transformed into sensible heat**
- **draining of a land can be reversed through comprehensive conservation of rainwater**
- **renewal of small water cycle over land can temper extreme weather events and ensure a growth in water reserves**

•
www.waterparadigm.org

Old water paradigm

- **protects surface water as the main source and reserve of water**

New water paradigm

- **protects groundwater and soil water as the main treasure of water**

www.waterparadigm.org

Old water paradigm

- **rainwater is an inconvenience, needs to be quickly removed**

New water paradigm

- **rainwater is an asset that needs to be retained (especially in soil/plants)**

www.waterparadigm.org

Old water paradigm

- **soil sealing has minimal impact on the water cycle**

New water paradigm

- **soil sealing has a fundamental impact on the water cycle**

www.waterparadigm.org

Old water paradigm

- **soil sealing has minimal influence on global warming**

New water paradigm

- **soil sealing may be important factor in global warming**

www.waterparadigm.org

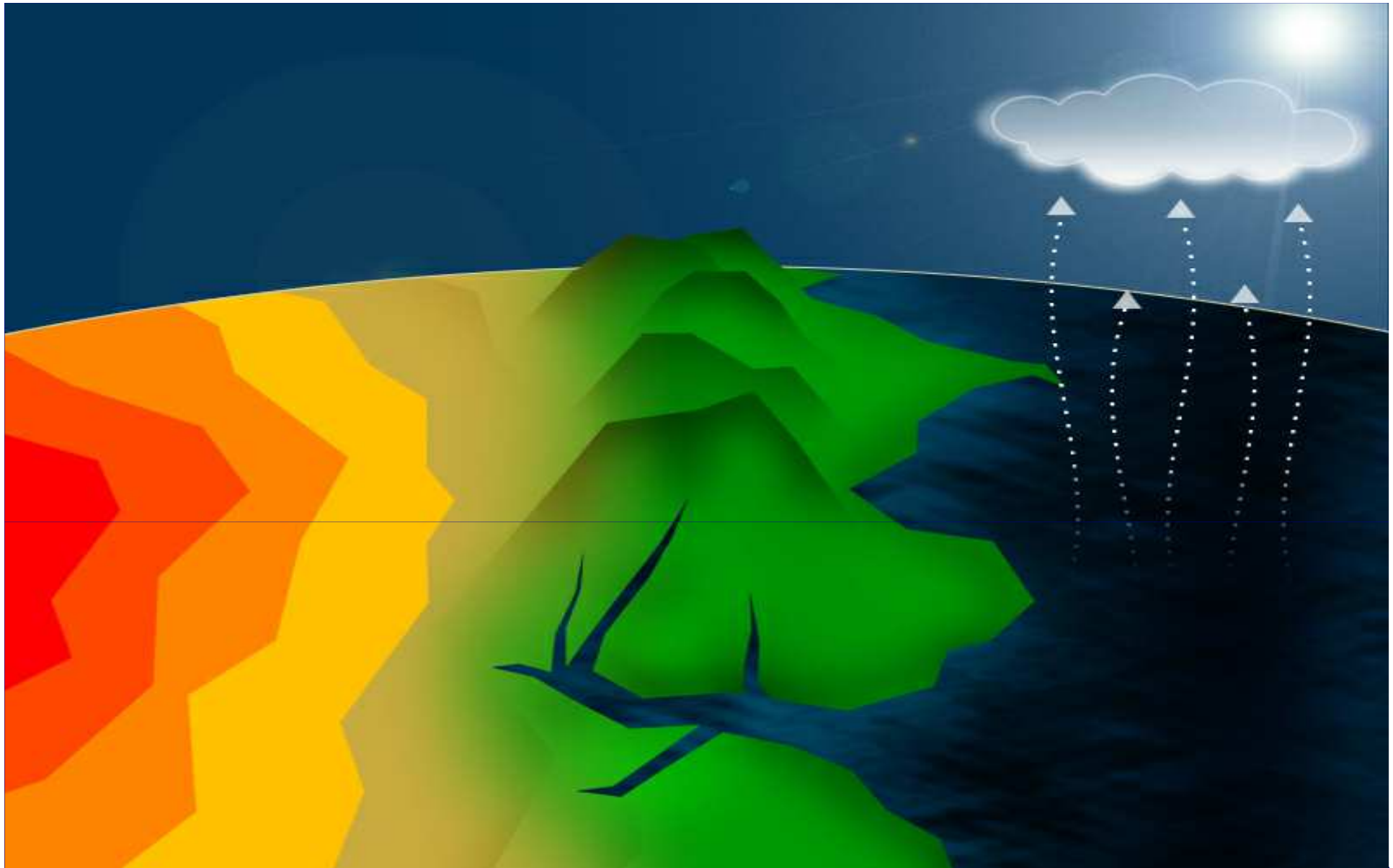
RAINWATER HARVESTING ON MASSIVE SCALE

1. enhances water sources
2. anti-flood protection
3. anti-erosion protection
4. moderates climate
5. enhances biodiversity
6. cheap, simple, effective

THE NEW WATER DEAL

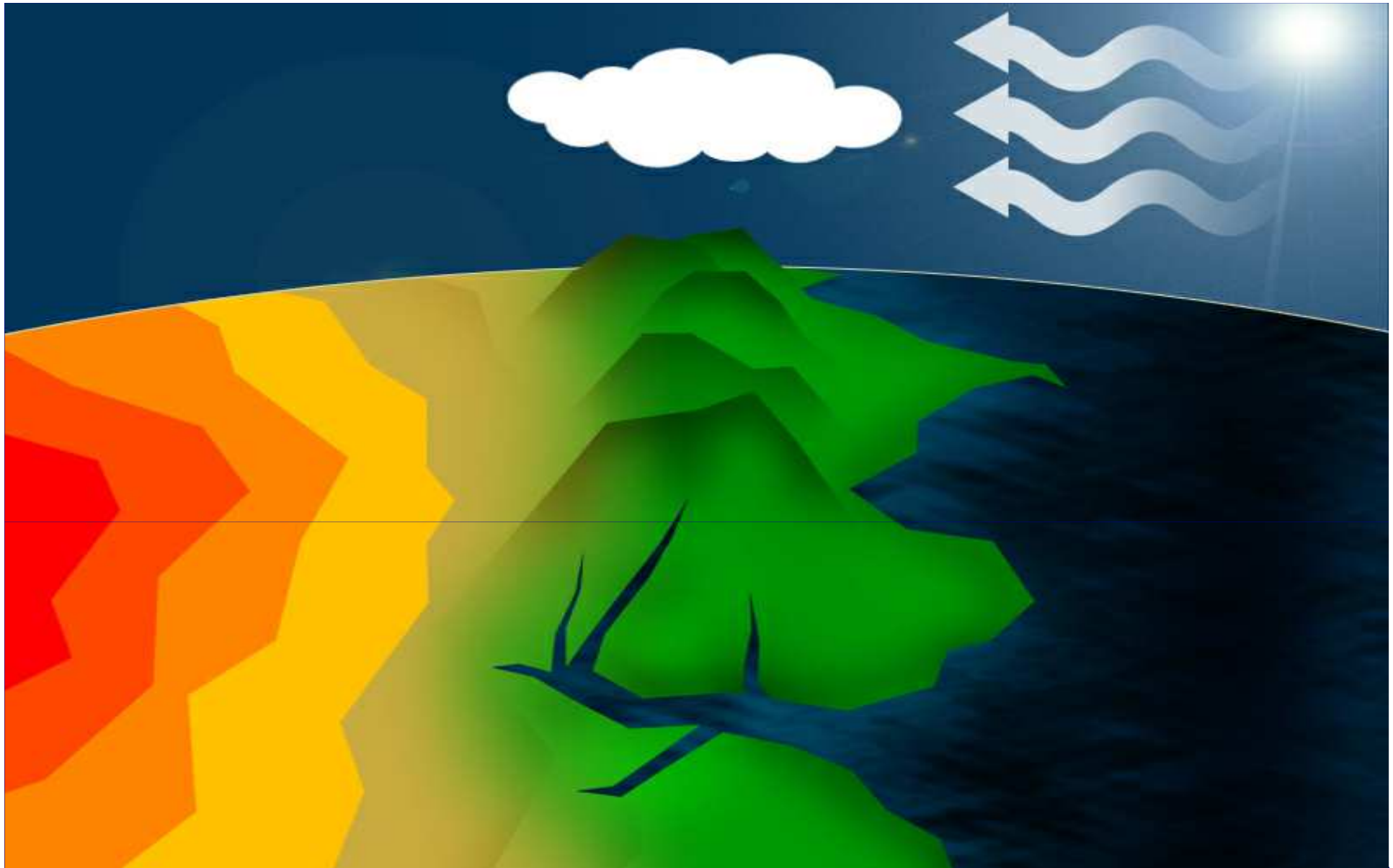
A program to achieve natural resources conservation, flood protection and mitigation of climate change by rainwater conservation in the landscape:

1. creation of over 50 million jobs
2. water-holding measures to collect 700 km³ rainwater a year
3. duration ten years

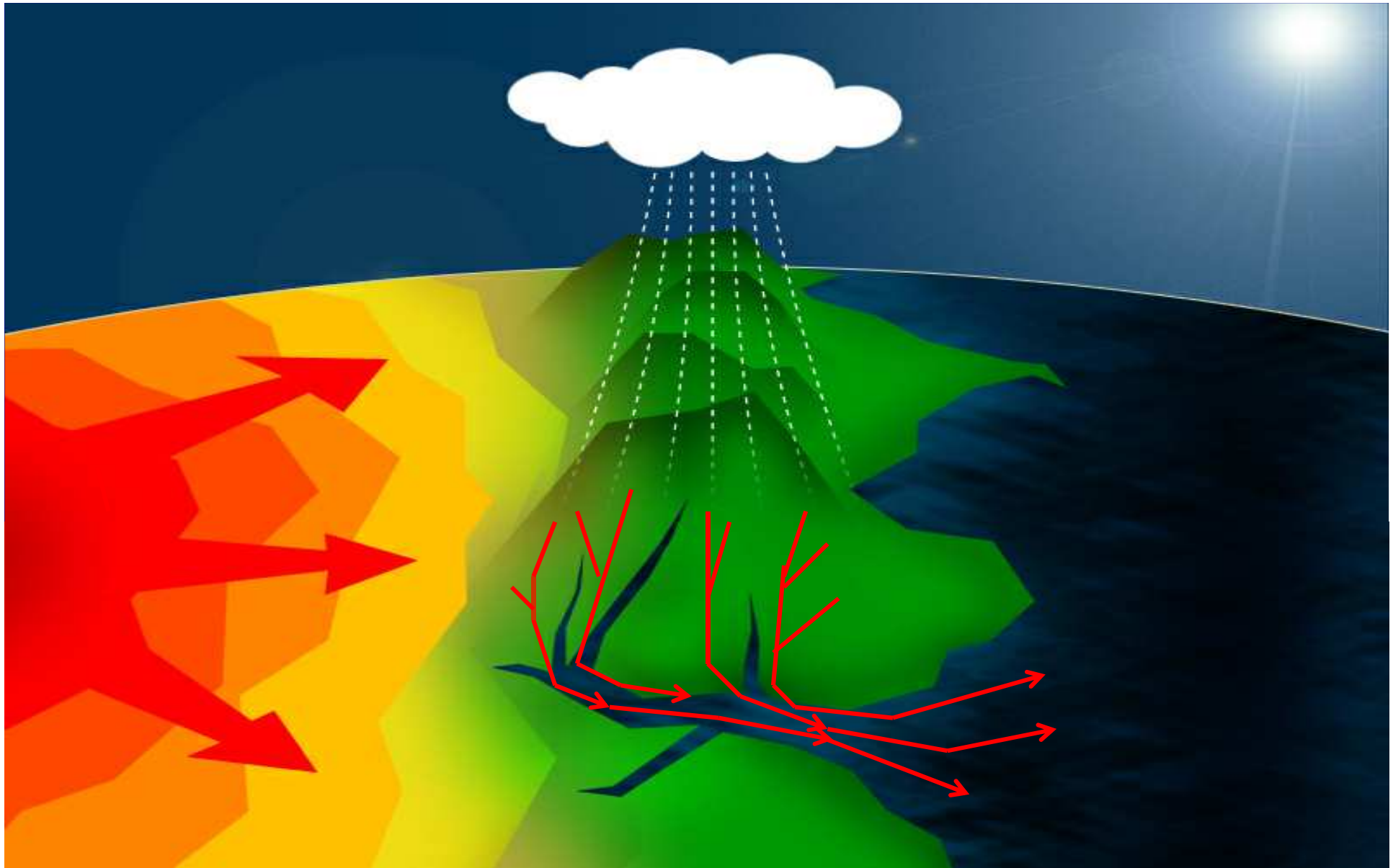


NGO People and Water

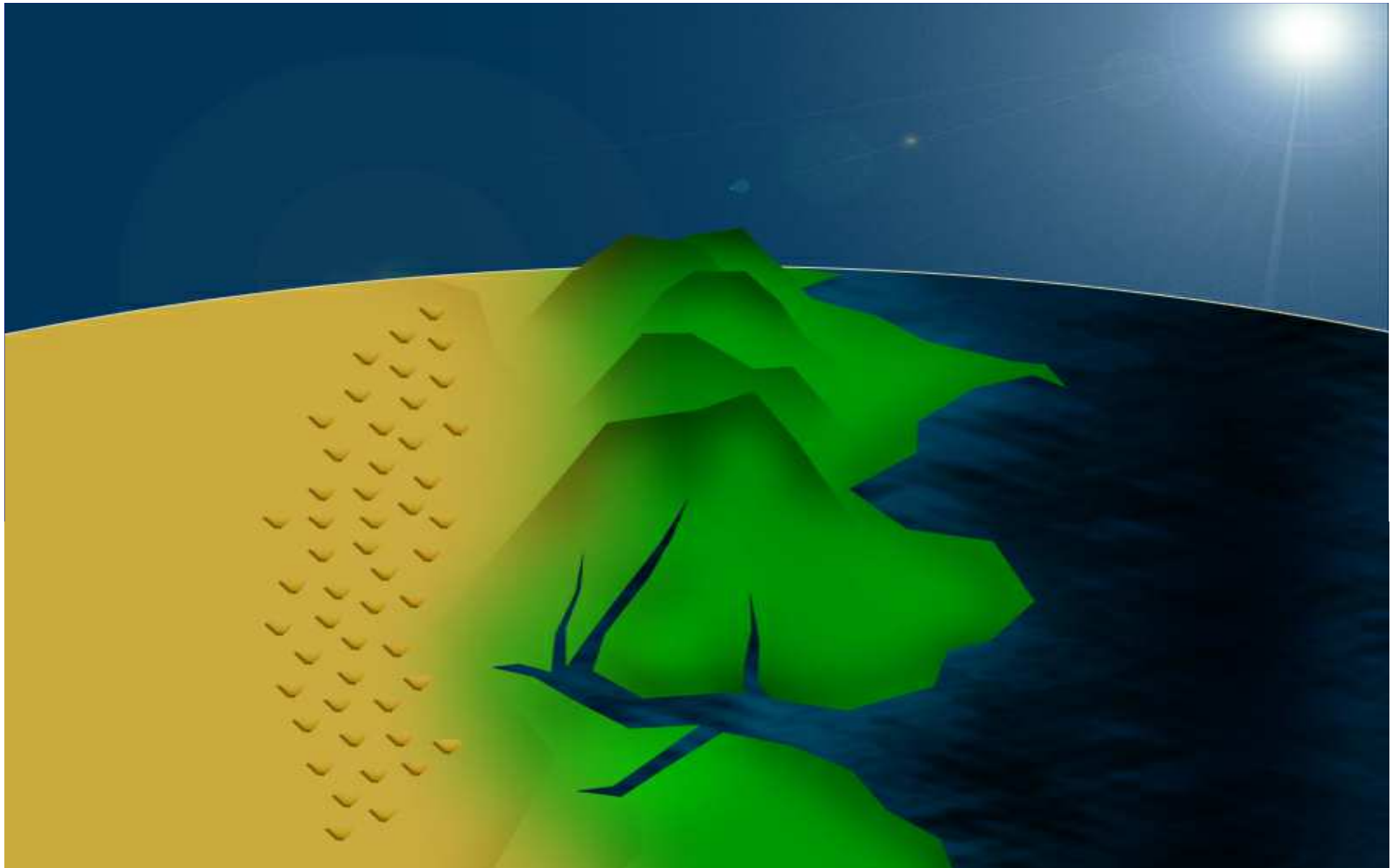
www.ludiaavoda.sk



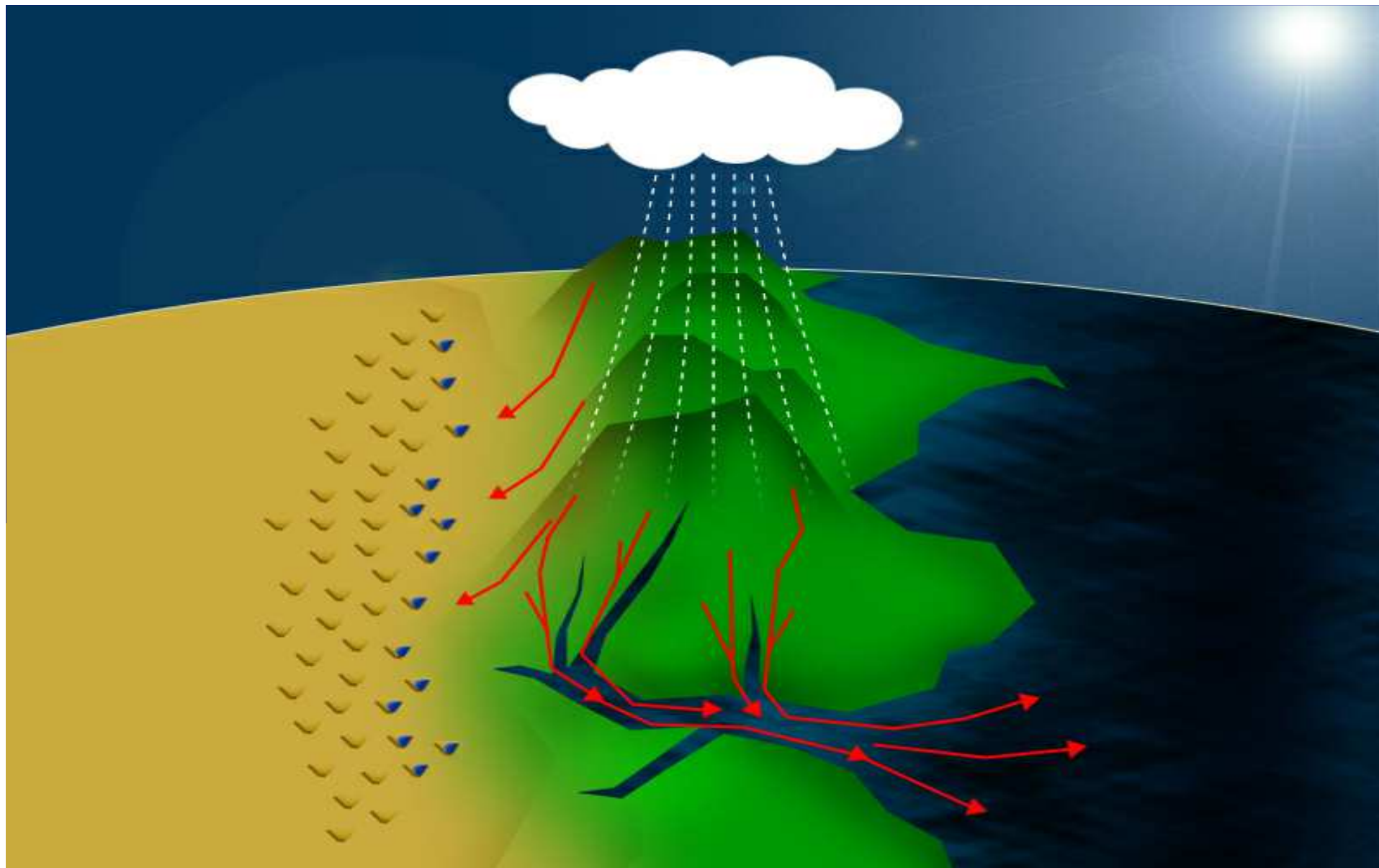
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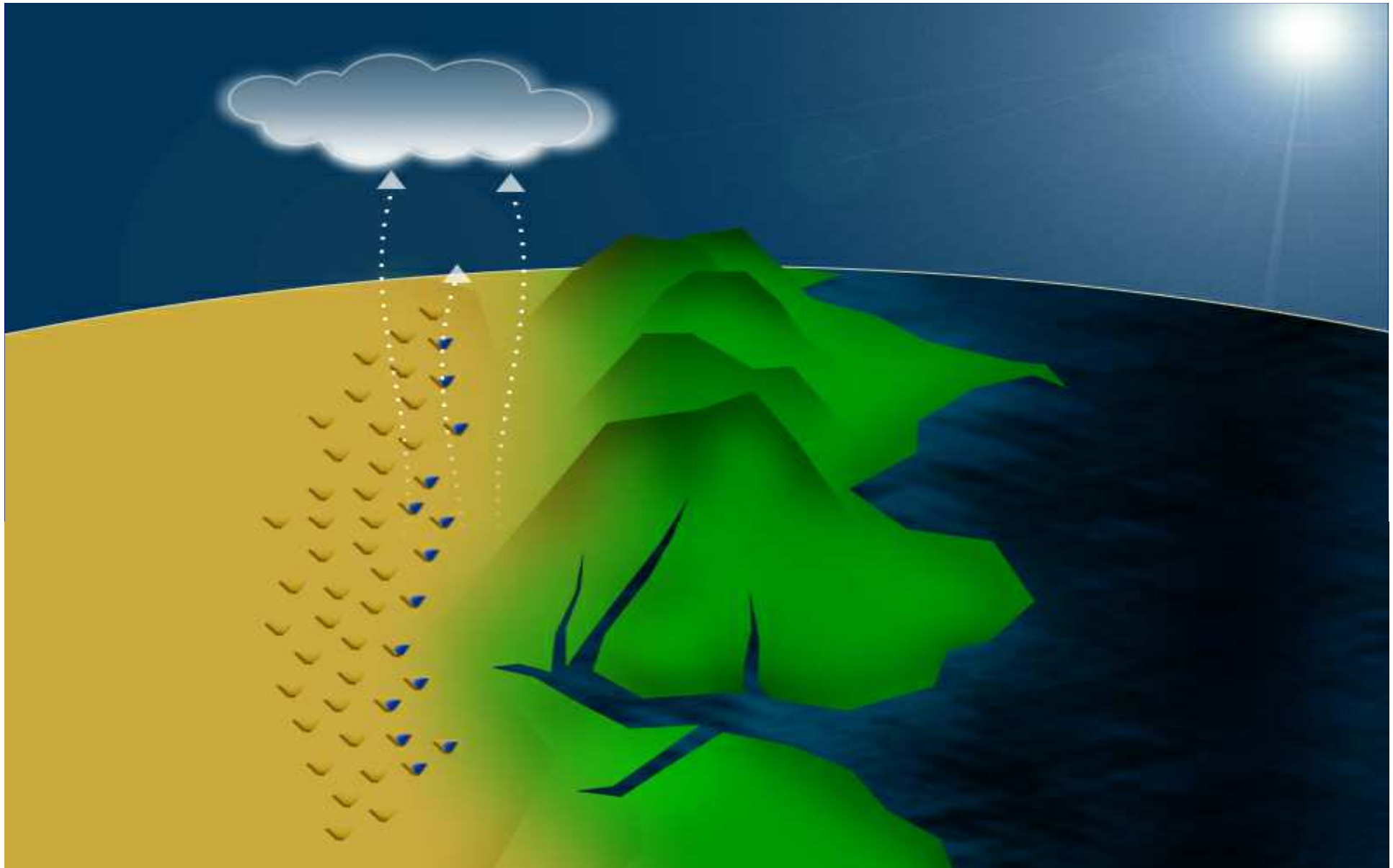
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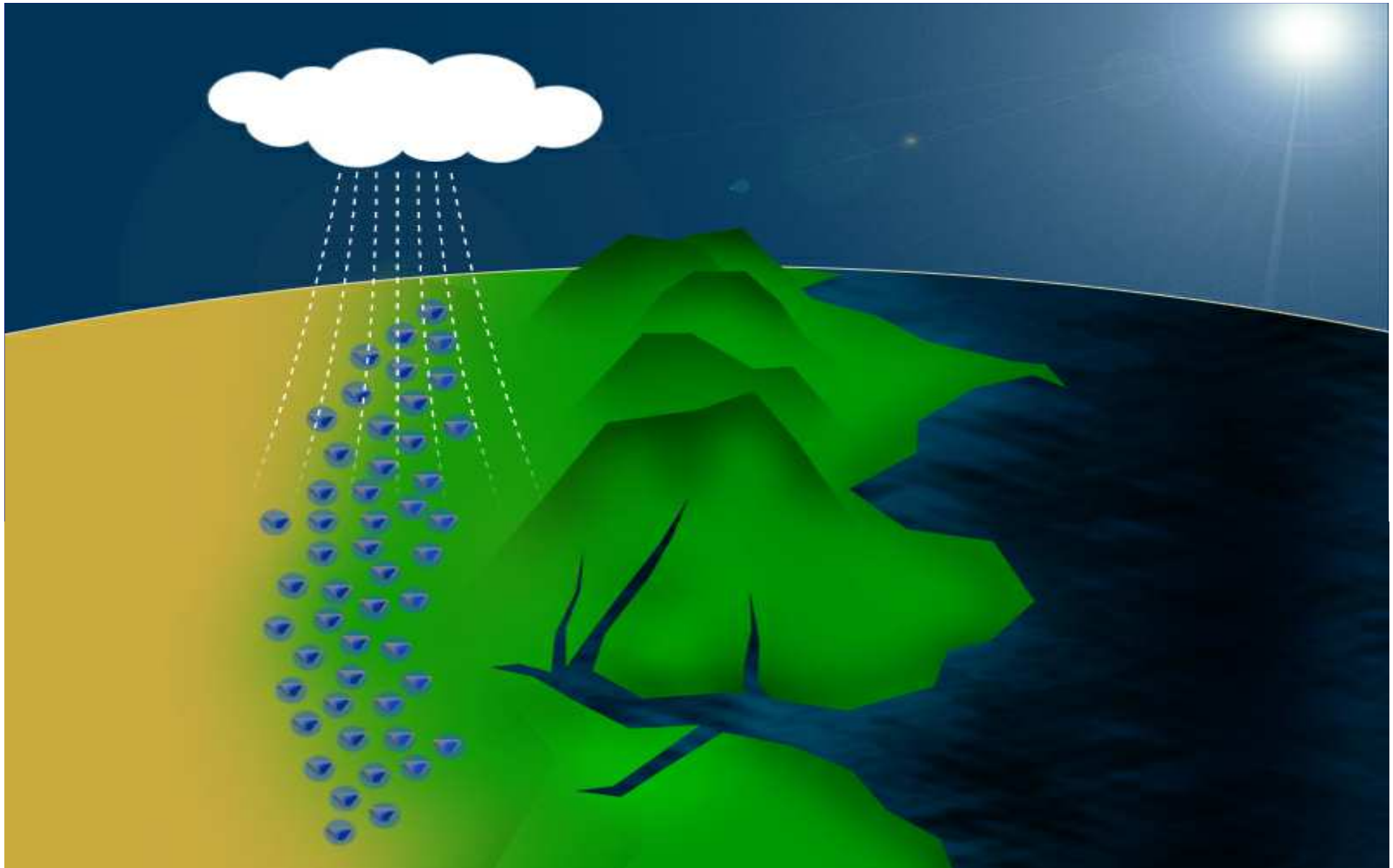
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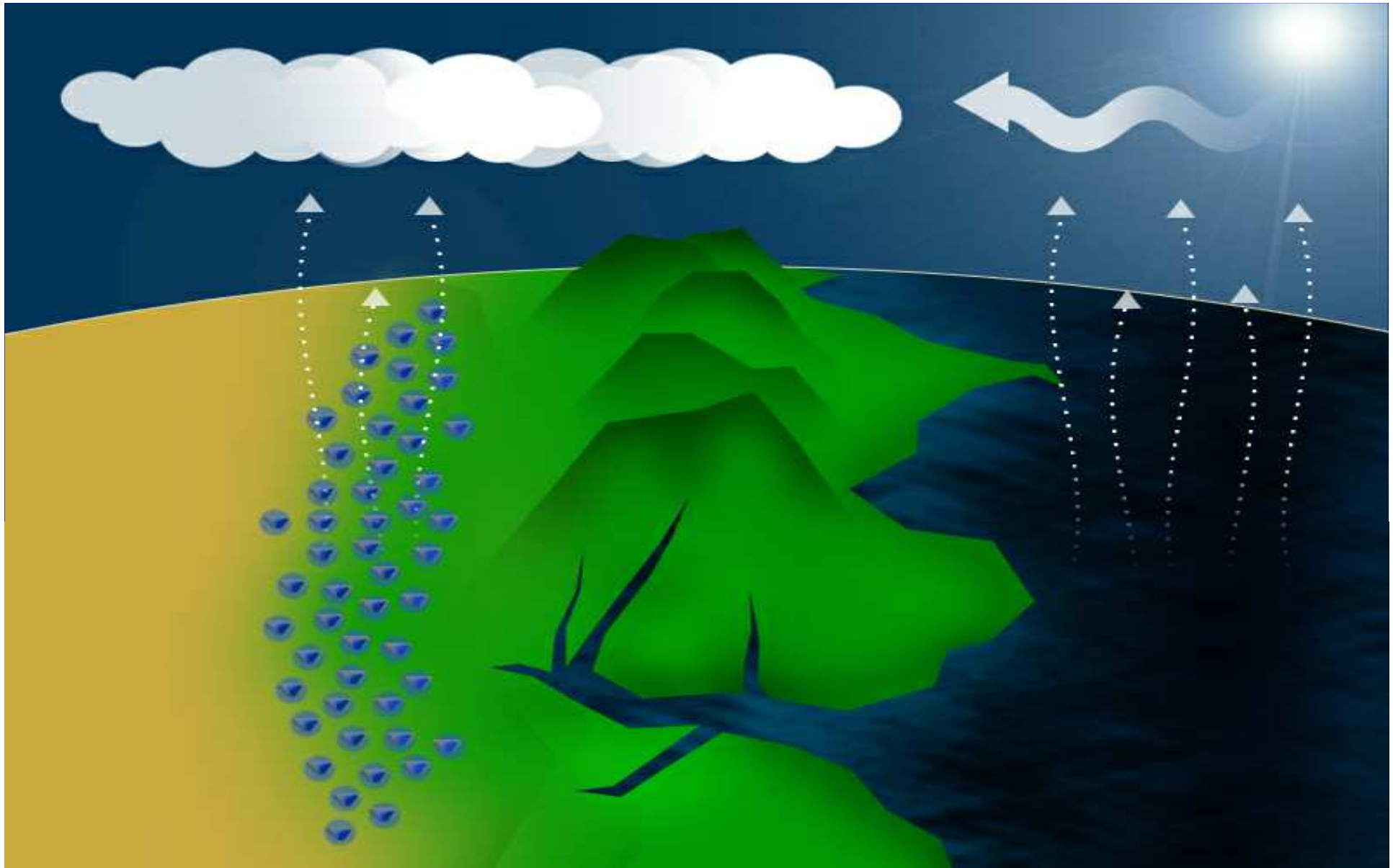
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**Thank You
very much
for Your
Attention!**

Useful links:

www.ourclimate.eu

www.watergy.de

www.enki.cz

www.waterparadigm.org

www.ludiaavoda.sk

WATER = LIFE



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