

WATER and CLIMATE on THE BLUE PLANET

Michal Kravčík
People and Water, NGO
Slovakia



Nižne Repáše, August 2014

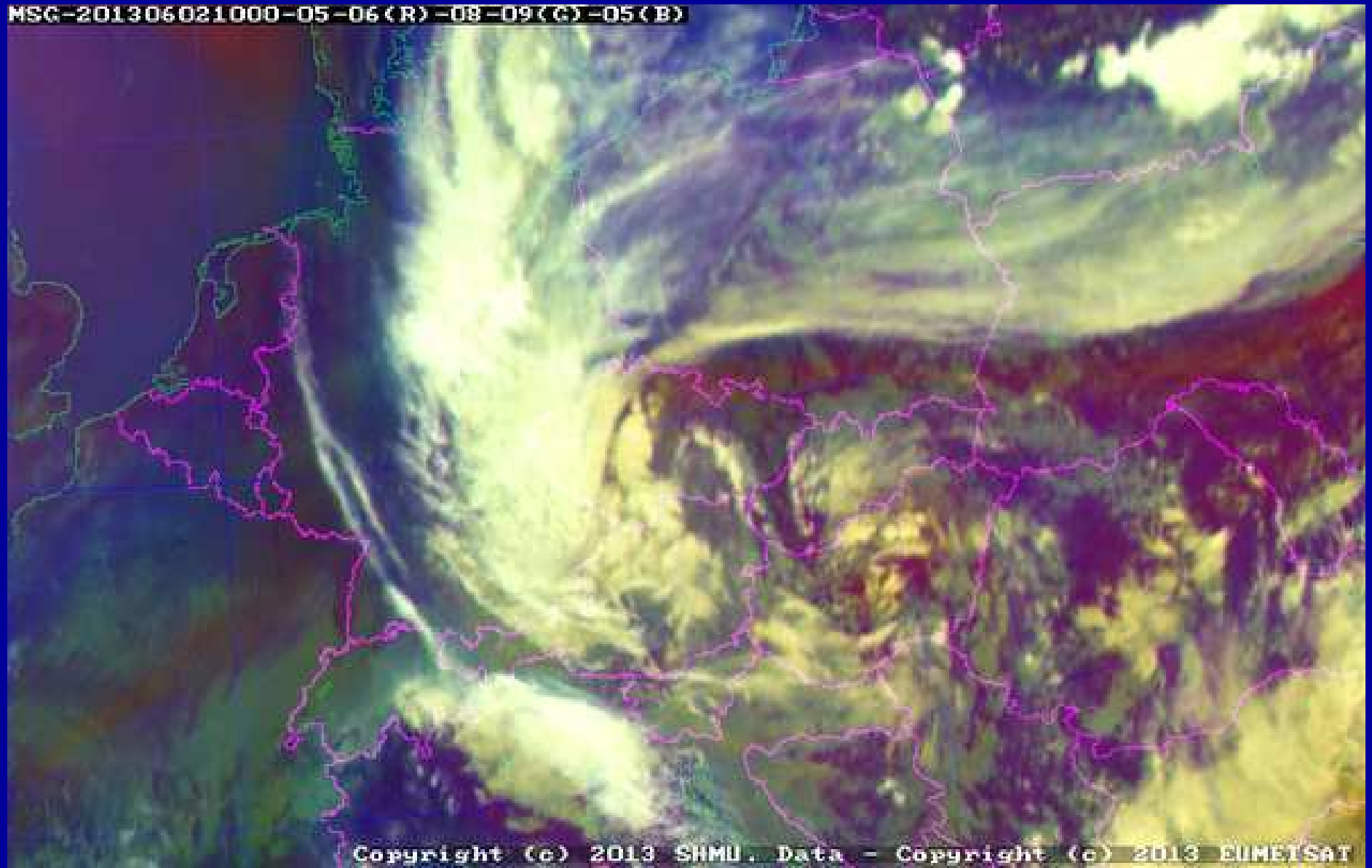
1. More heavy storms
2. More natural damages
3. Increasing of extremality of weather and heavy rain
4. More water erosion process
5. More fires
6. Time and space changes of rain distribution
7. Lack of water sources for nature
8. More drying up regions
9. Threat of safety of food
10. Threat of biodiversity
11. Growing of population



Bad perspective with drying up of landscape


Central Europe 2012

MSG-201306021000-05-06 (R) -08-09 (C) -05 (B)



Copyright (c) 2013 SHMU. Data - Copyright (c) 2013 EUMETSAT



A satellite image of Super Typhoon Haiyan, showing a well-defined eye and spiral cloud bands. Two red arrows are overlaid on the image to indicate the source of warm air: one points from the upper left towards the storm's center, and the other points from the lower right towards the center. The text 'hot air from China' is written vertically inside the first arrow, and 'hot air from Australia' is written vertically inside the second arrow. A red box with white text is located at the bottom left of the image.

hot air from
China

hot air from
Australia

Super Typhoon Haiyan

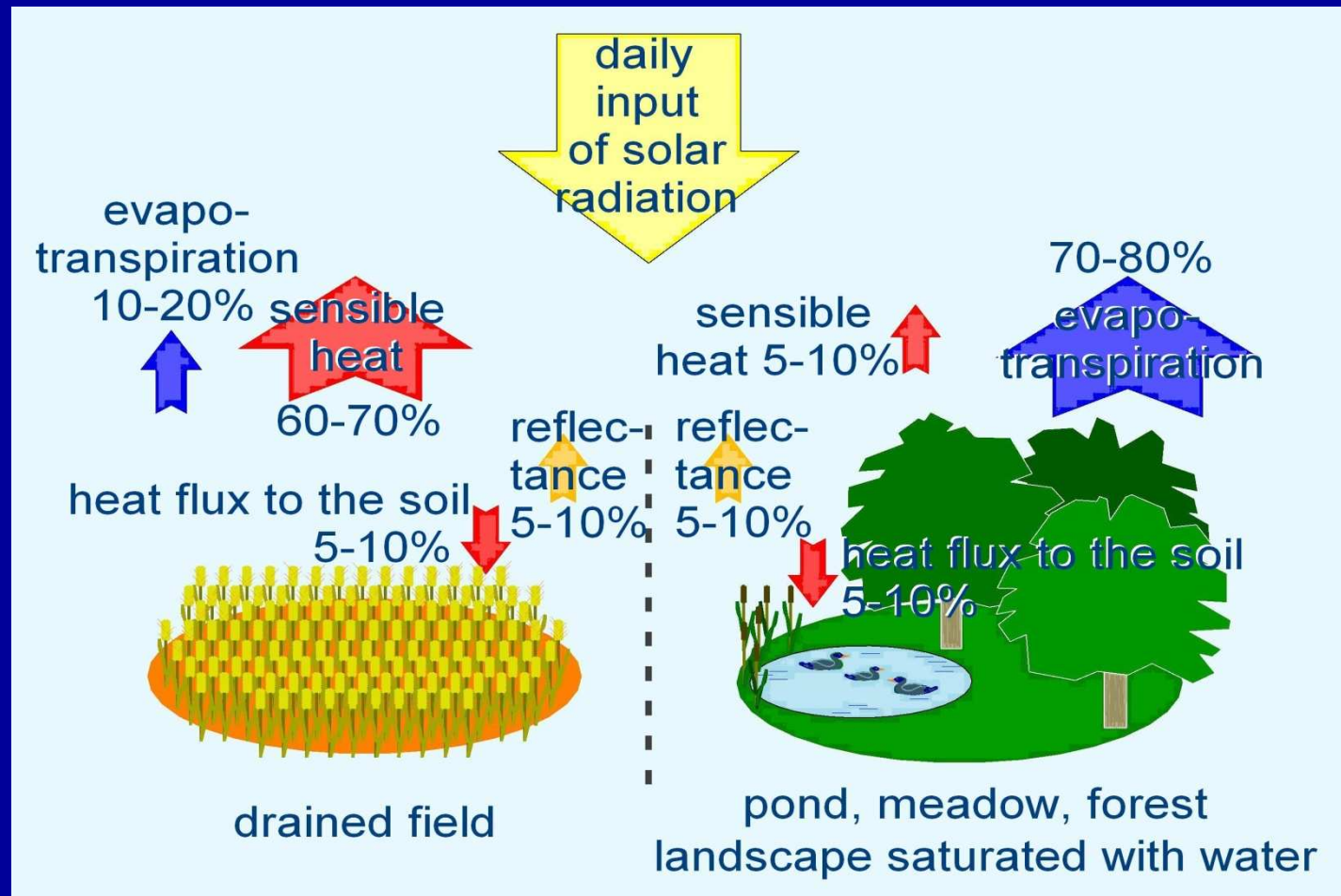
Superstorm Sandy





On the end: Global floods

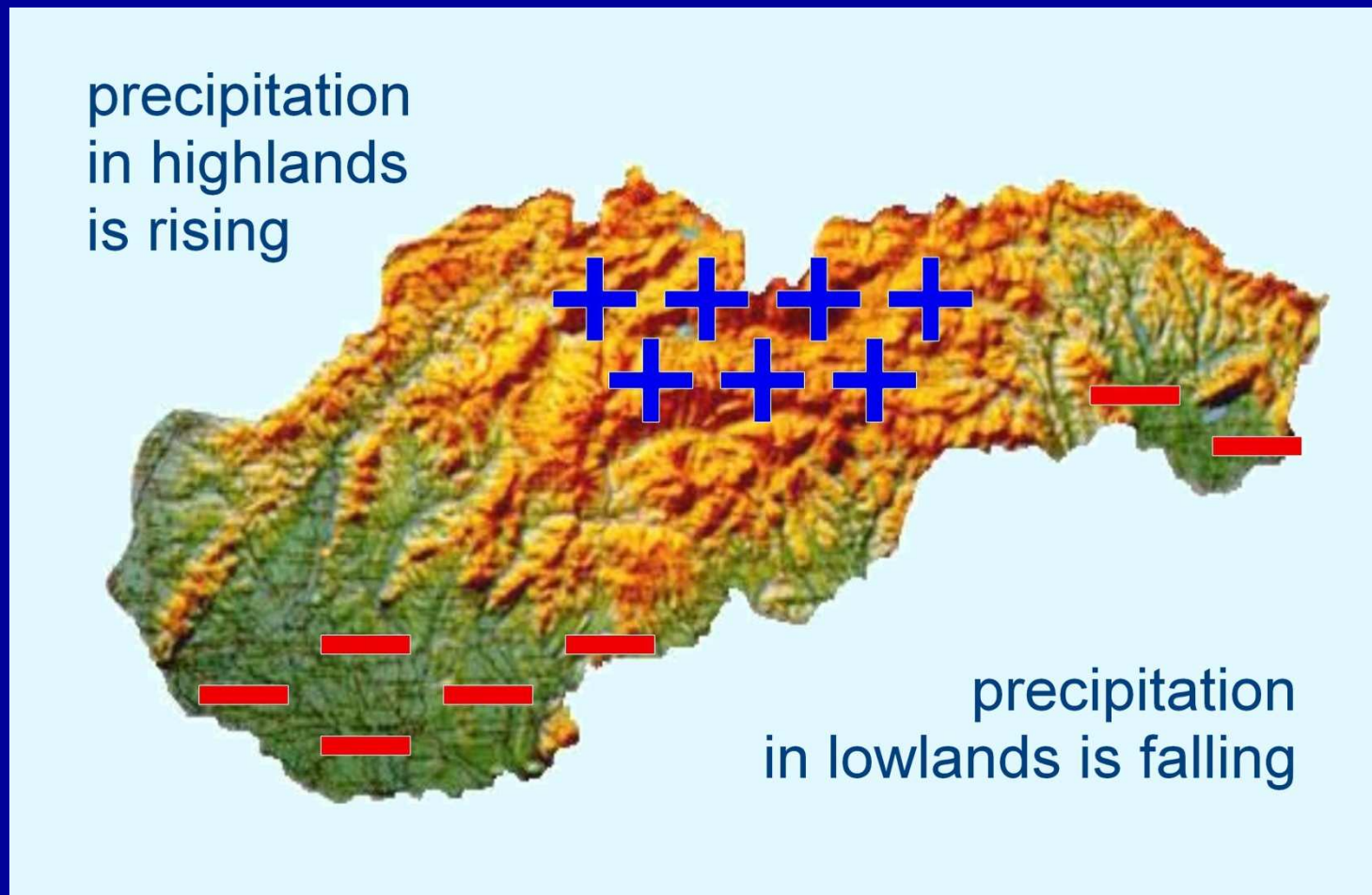
DISTRIBUTION OF SOLAR ENERGY



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

Wet land: Most solar energy is consumed on vapor water from landscape

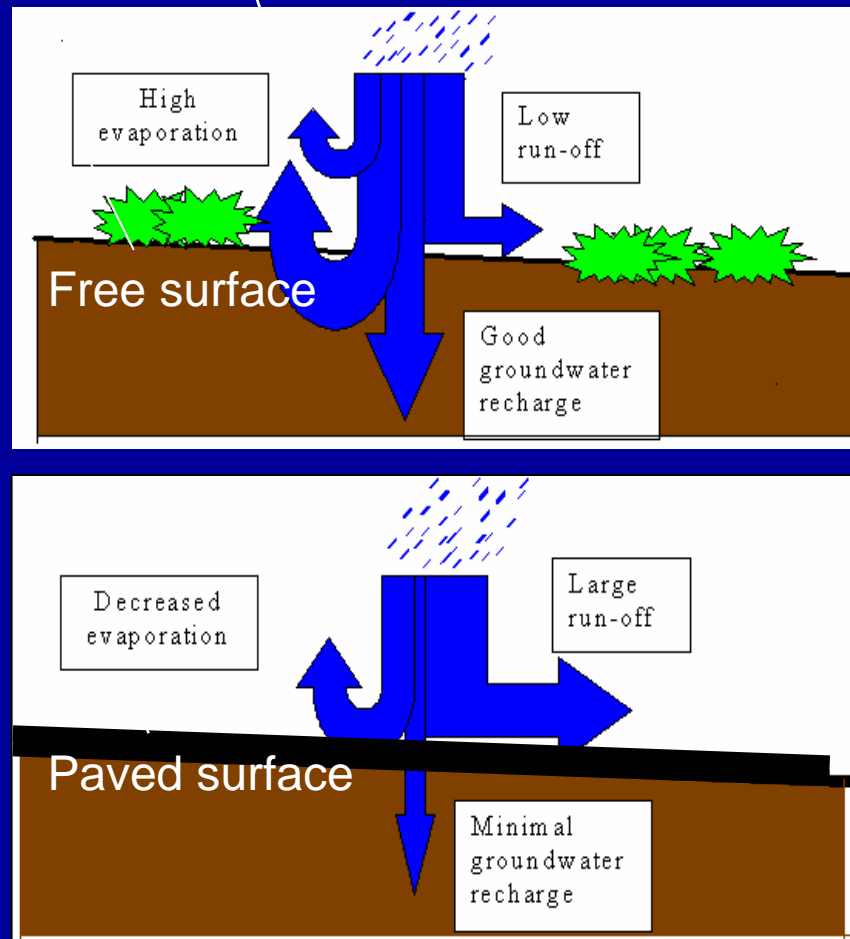
The rain in Slovakia fails mainly on the plain...



What we inherited ?



Impact of deforestation, agriculture and urbanization on state of water in small water cycles:



- runoff increases, infiltration and evaporation decrease
- More than 30.000 billion m³ of rainwater was lost from landscape of continents over last 70 years
- More than 10 cm sea level rise

Water runoff on forestry road network!



Water runoff on forestry road network!



Agricultural lands drying by roads !



Agricultural lands drying by bad management !



Forest lands drying by roads !



Drying lands by roads



DEFORESTATION & AGRICULTURE



Deforestation / some forms of farming cause:

- increase of runoff (and erosion)
- lower infiltration (groundwater recharge)
- lower evaporation (change of regional climate)

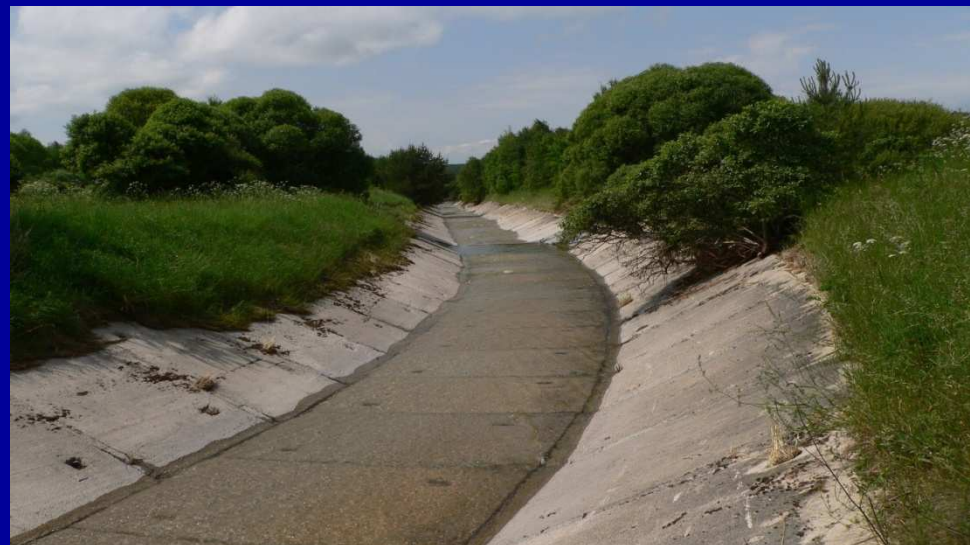
SOIL SEALING IN CITIES

about 20 billion m³ of rainwater sluiced from municipalities of Europe annually, and about 760 bil m³ sluiced from all continents annually.

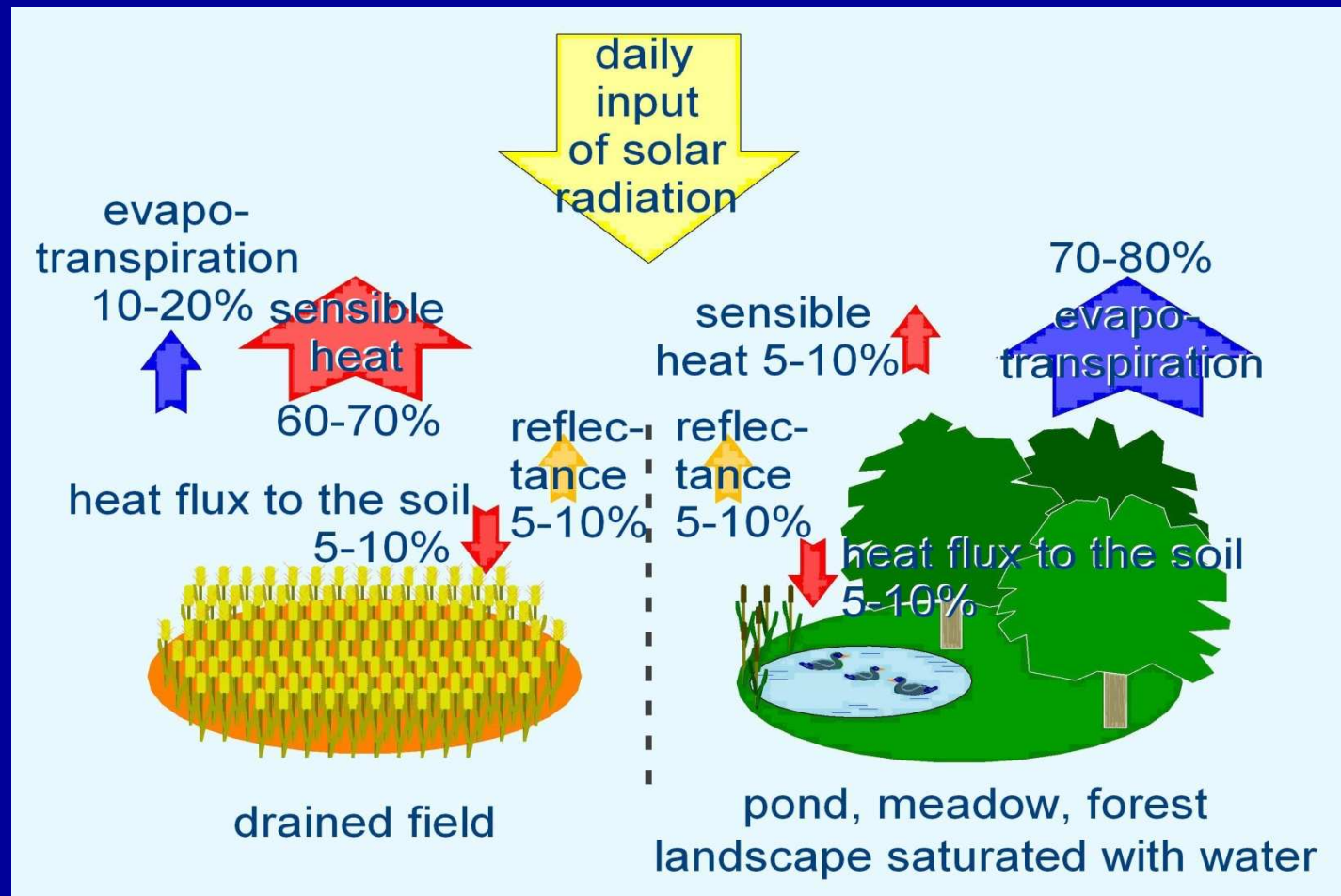


ALTERATION OF RIVERS

- **natural meanders removed**
- **adjacent swamps drained**
- **shortening length increases slope**
- **acceleration of runoff**
- **lowering land's ability to retain water**



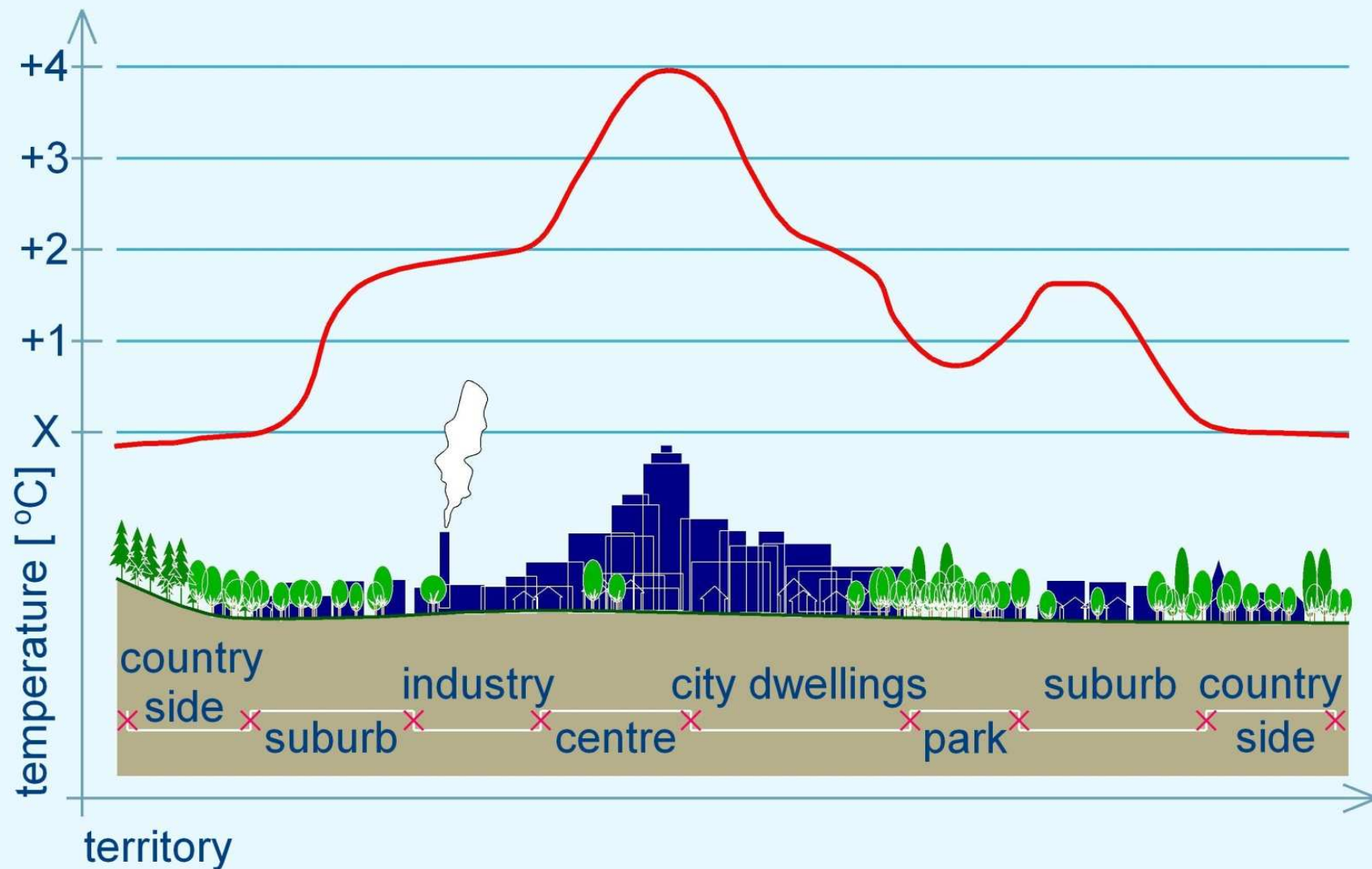
DISTRIBUTION OF SOLAR ENERGY



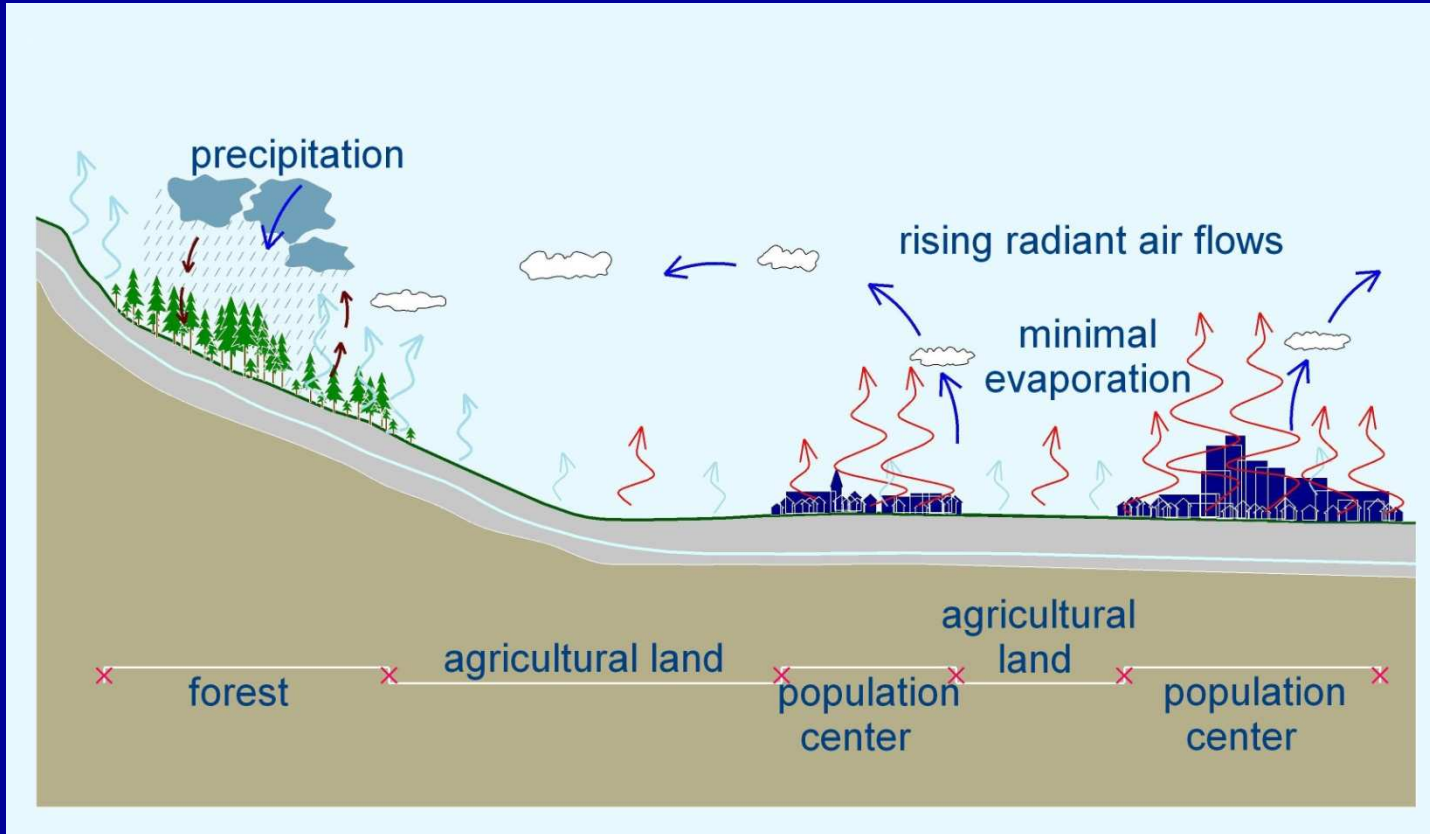
Dry land: Most solar energy is changed into *sensible heat*,

Wet land: Most solar energy is consumed on vapor water from landscape

HEAT ISLANDS OVER DRY and HOT LANDSCAPE

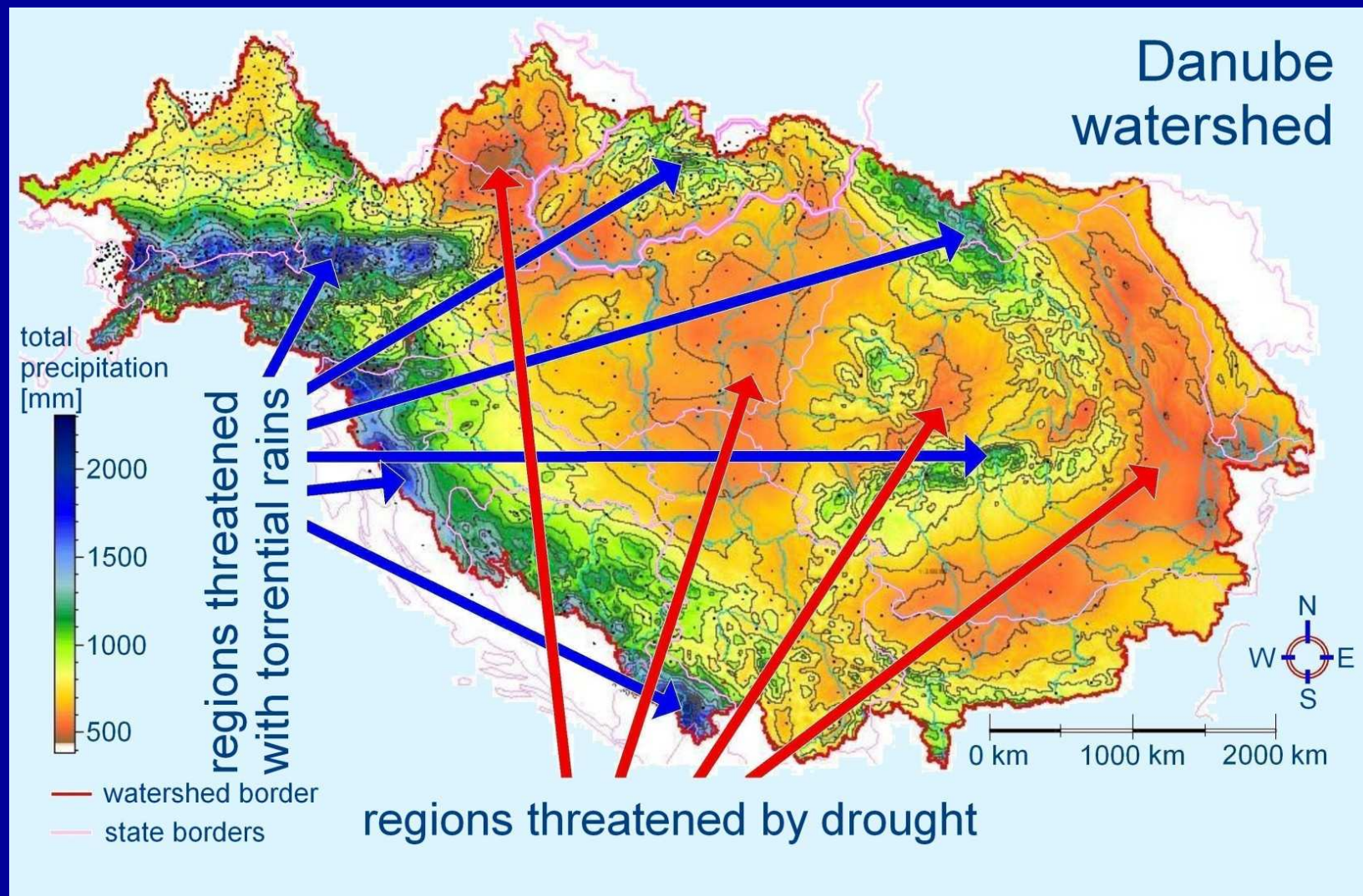


IMPACTS ON WEATHER / CLIMATE

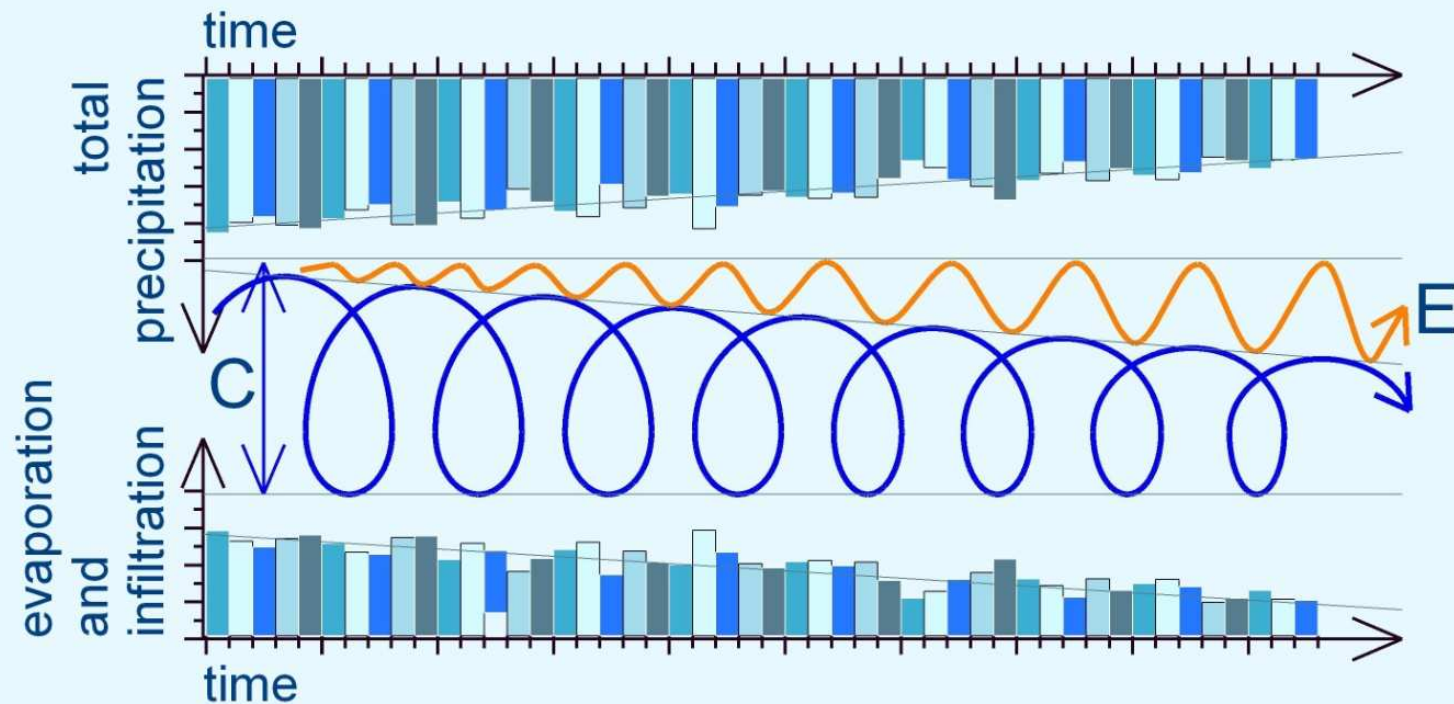


Frequency of droughts and
floods increasing

PRECIPITATION IN MOUNTAINS AND LOWLANDS – DANUBE WATERSHED



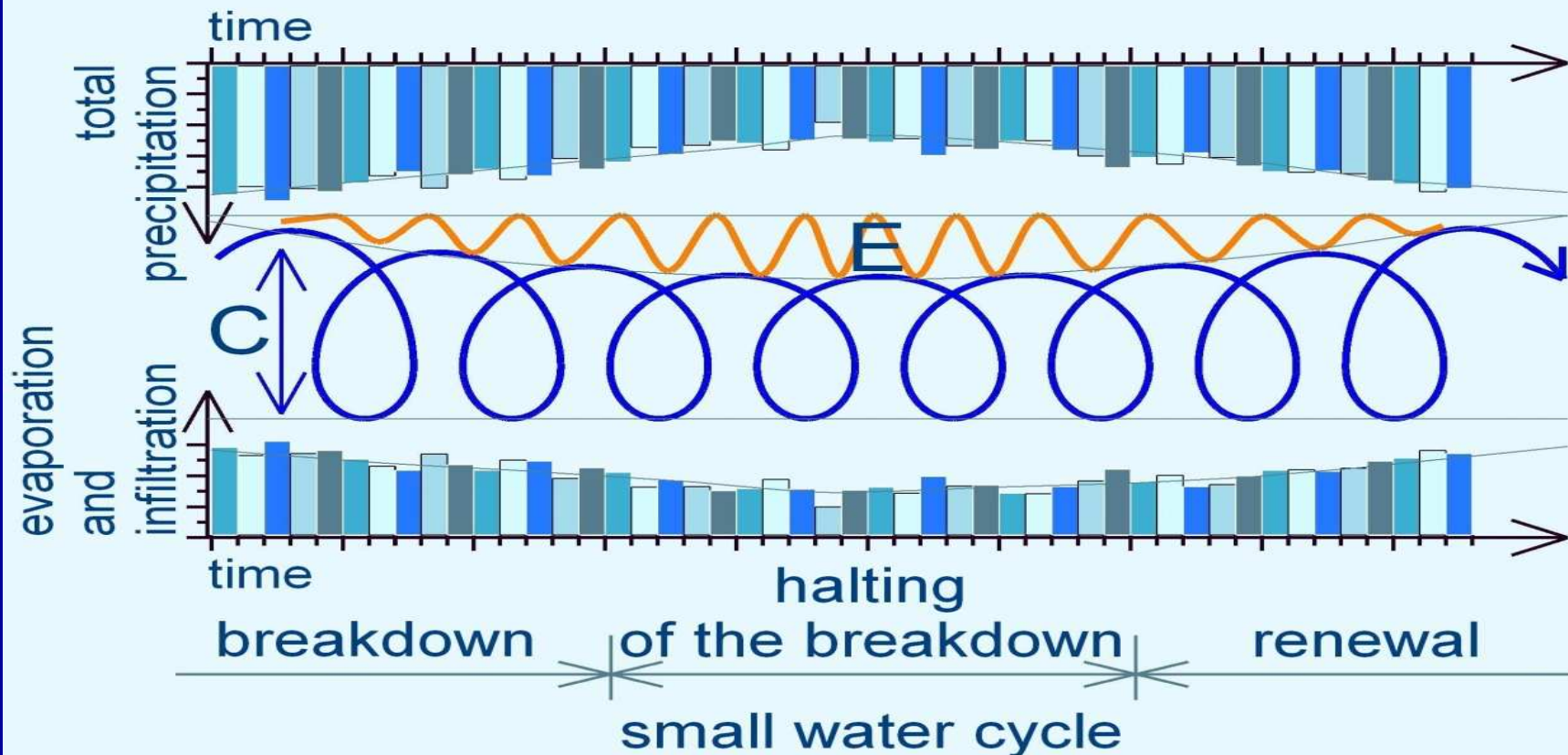
GROWTH OF EXTREME WEATHER WITH DECLINE OF SMALL WATER CYCLES



C - diagram of the circulation of water on land

E - diagram of extreme weather events

DESTRUCTION AND RENEWAL OF SMALL WATER CYCLE



C - diagram of the circulation of water on land

E - diagram of extreme weather events

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**

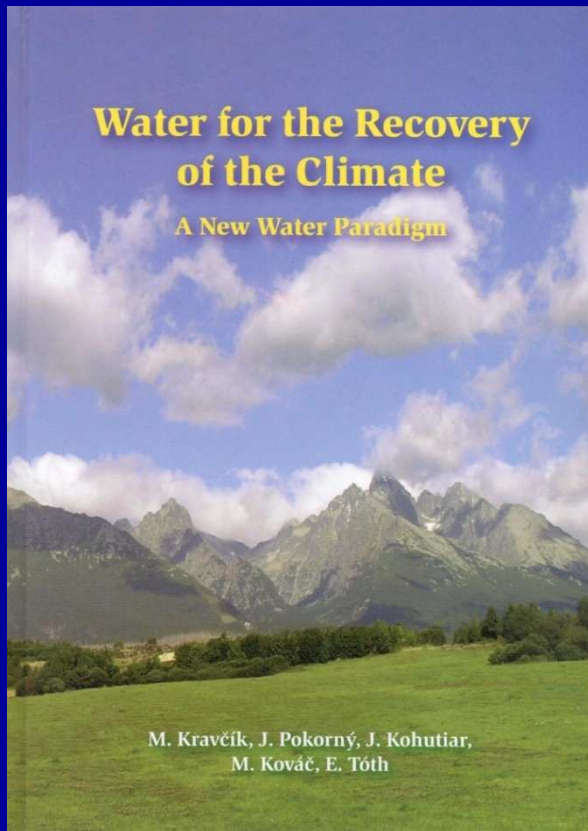
New water paradigm

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

www.waterparadigm.org

Initiative by group of Central European Activists

Water for the Recovery
of the Climate
A New Water Paradigm



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

Discussion Contribution

**“THE SUBSTANTIAL
ROLE OF WATER
IN THE CLIMATE
SYSTEM OF THE
EARTH”**

**(distributed to more
than 7.000
institutions around
the globe)**



OurClimate.eu

www.ourclimate.eu

Contact in Copenhagen:

Michal Kravčík

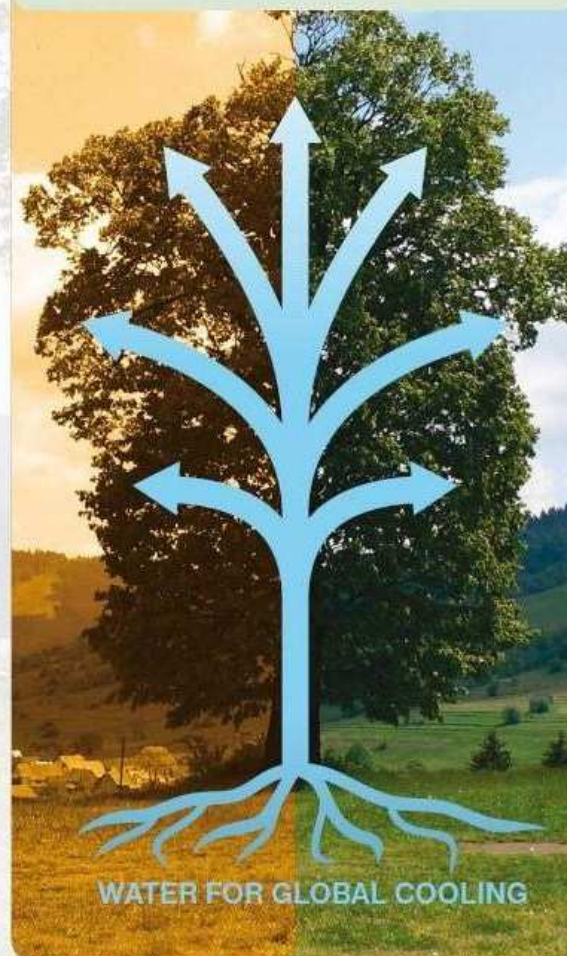
NGO People and Water (Slovakia), Chairman

E-mail: kravcik@ludiaavoda.sk

Mobile phone: +421 905 482 099

WATER, VEGETATION AND CLIMATE CHANGE

Košice Civic Protocol
(addressed to COP15 - Copenhagen)



NEW WATER DEAL

more clouds



more soft rain

higher air humidity



more evaporation from lands

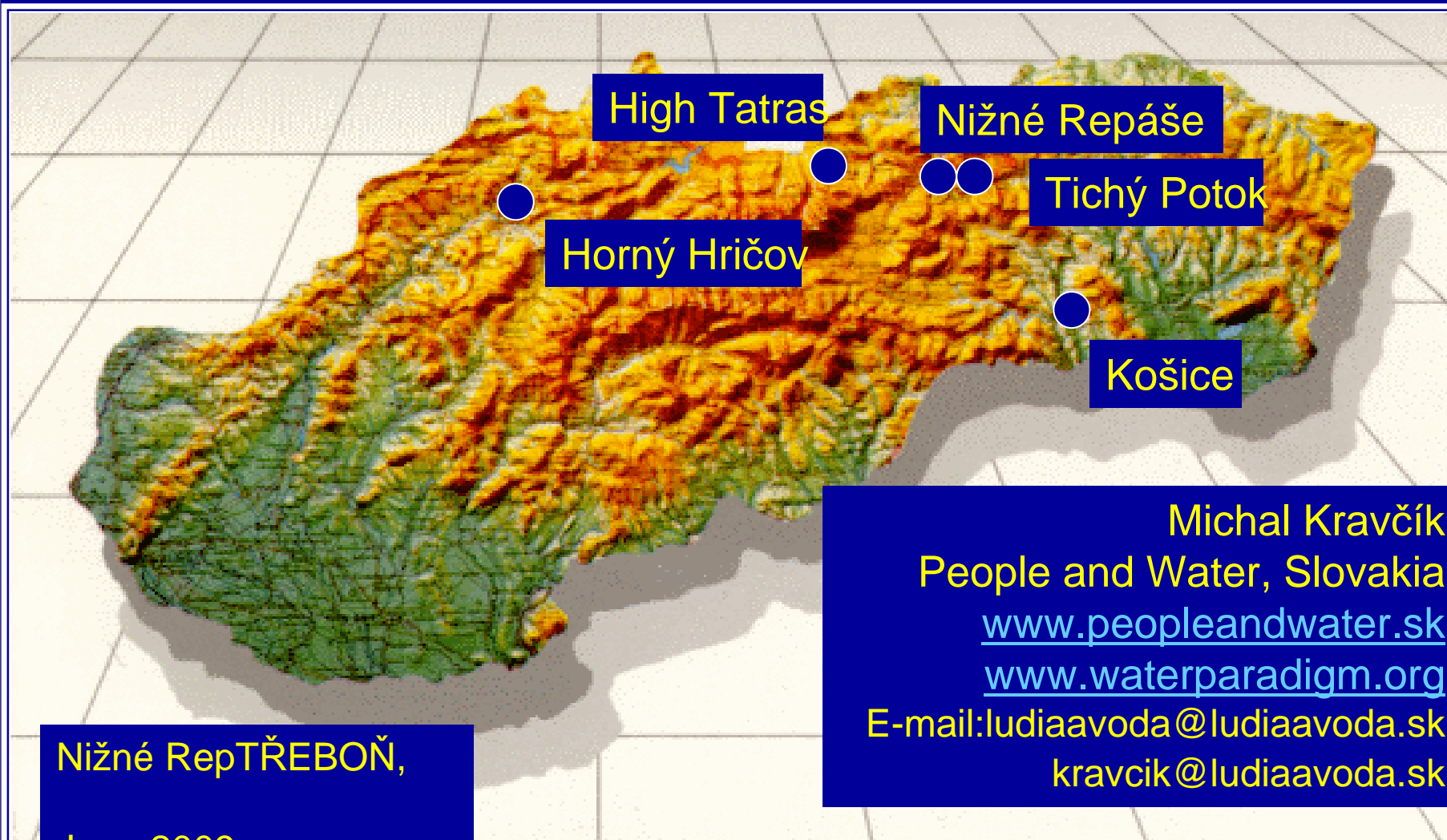
more vegetation and biodiversity

more groundwater recharge

THE NEW WATER DEAL for BLUE PLANET

- **Creation more than 50 million jobs for poor people**
- **waterholding measures can returne 1000 km³ rainwater a year to small water cycles**
- **duration ten years**
- **0,008 EUR/m³, while current technologies require cca 0,3 eur/m³**
- **costs about 400 billion EUR annually**

The cases for rehabilitation of devastated landscape by People and Water



Nižné RepTŘEBOŇ,

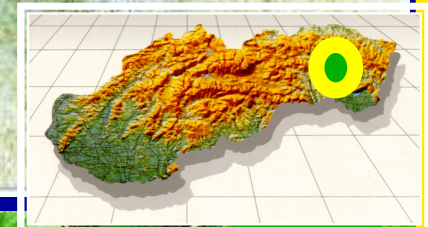
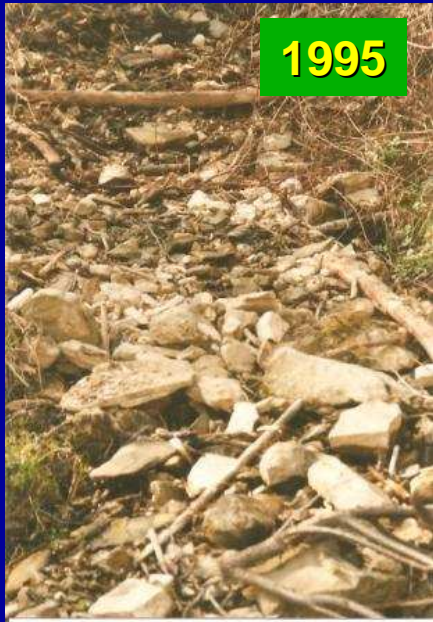
June 2000

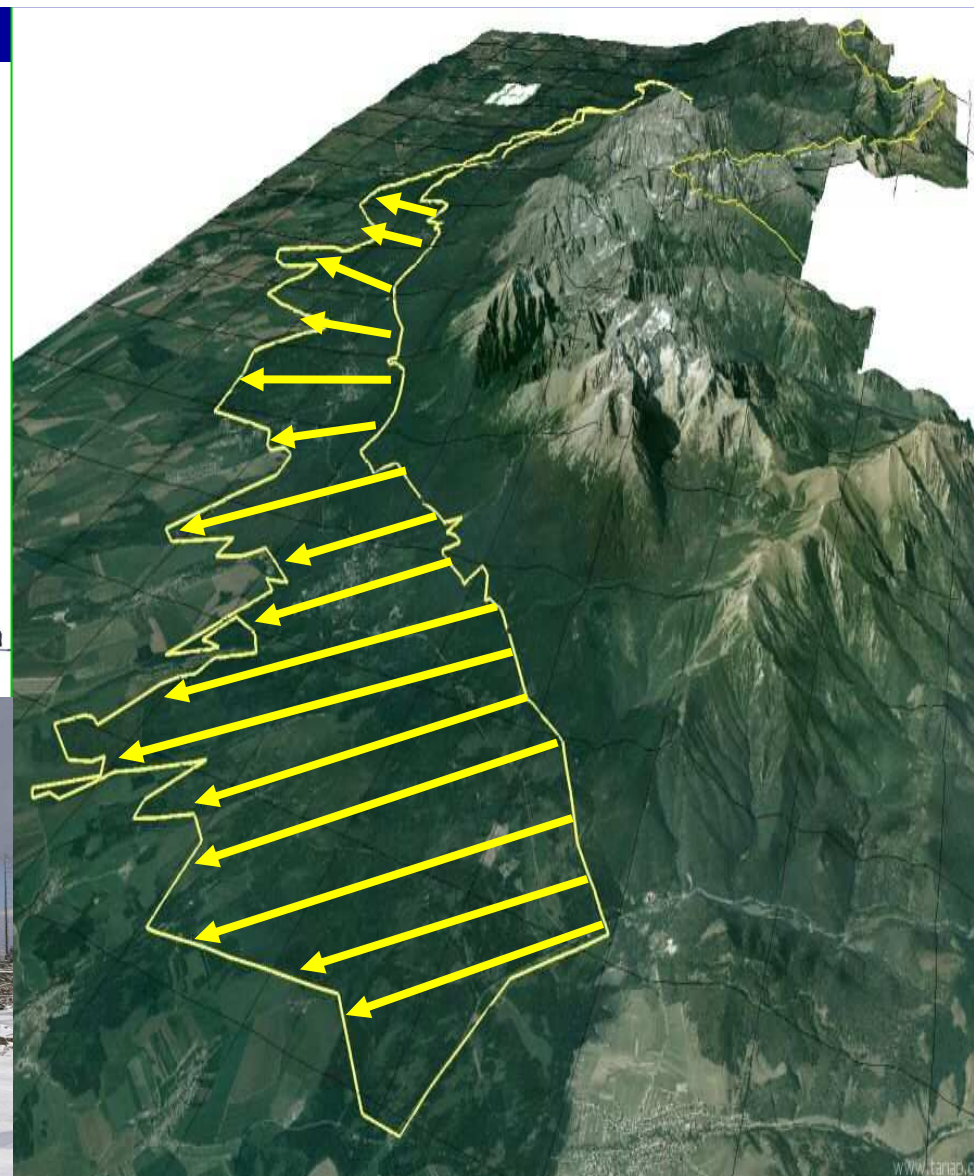
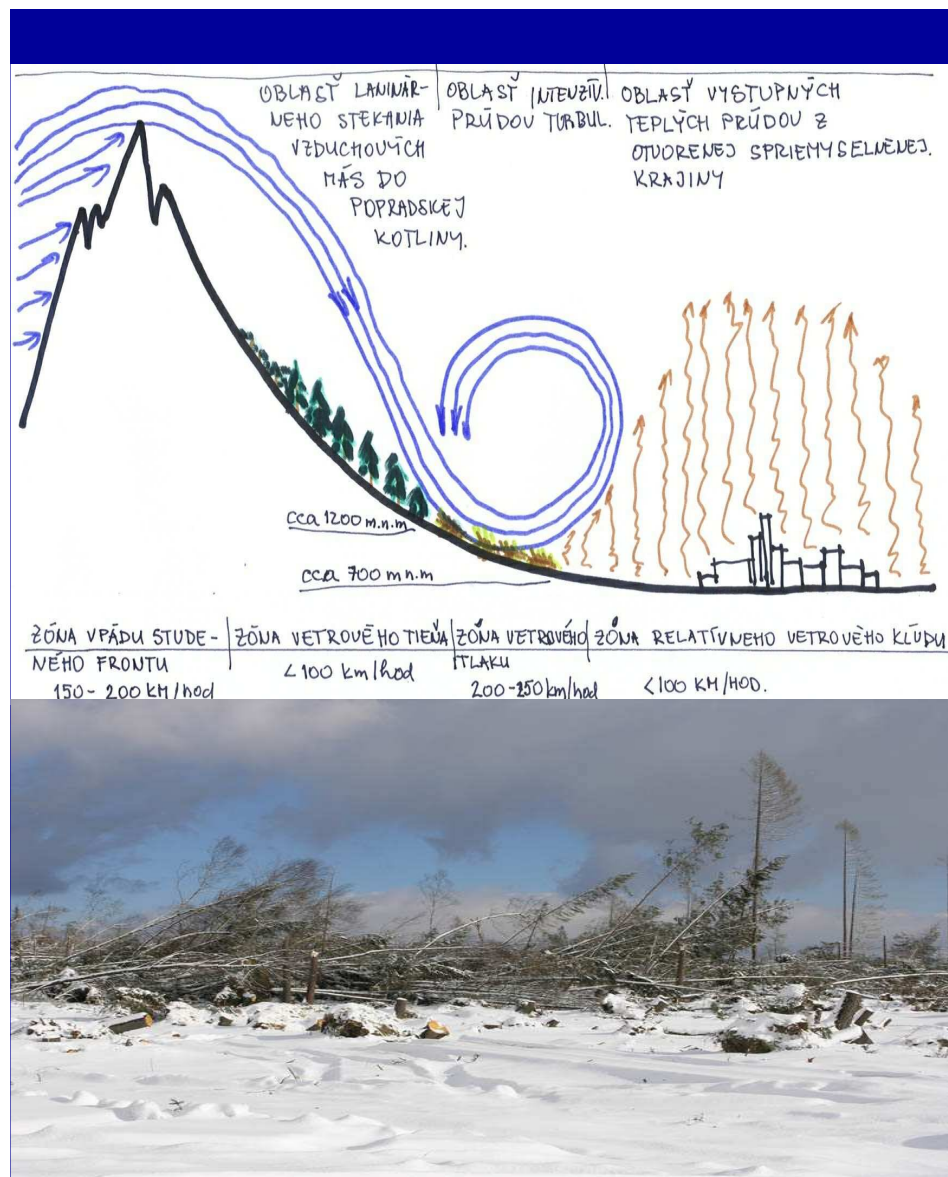
Michal Kravčík
People and Water, Slovakia
www.peopleandwater.sk
www.waterparadigm.org
E-mail: ludiaavoda@ludiaavoda.sk
kravcik@ludiaavoda.sk

BLUE ALTERNATIVE - TICHÝ POTOK, 1996



BLUE ALTERNATIVE





**What happened in November, 19th 2004
12.600 hectars of forest was damaged, with risks of drying up,
erosion and loss typical climate**



2nd Phase:
Building more than 2.000 waterholdings on the 40 ha of Water Forest
(July – September 2005)



3rd Phase:
Building waterholdings on the 12 ha of burned area
(September – October 2005)



4th Phase:
Planting new trees at Water Forest
October 2005 - May 2006



Water Forest in High Tatras after 5 years



Water Forest in High Tatras after 9 years

Flood protection Waterholding, High Tatras, Slovakia





Botanic garden in High Tatras 2006

Horný Hričov, 2009





November, 28th 2005



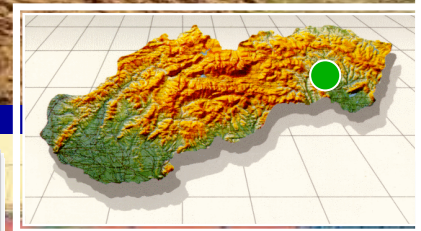
June, 6th 2006



June, 30th 2006

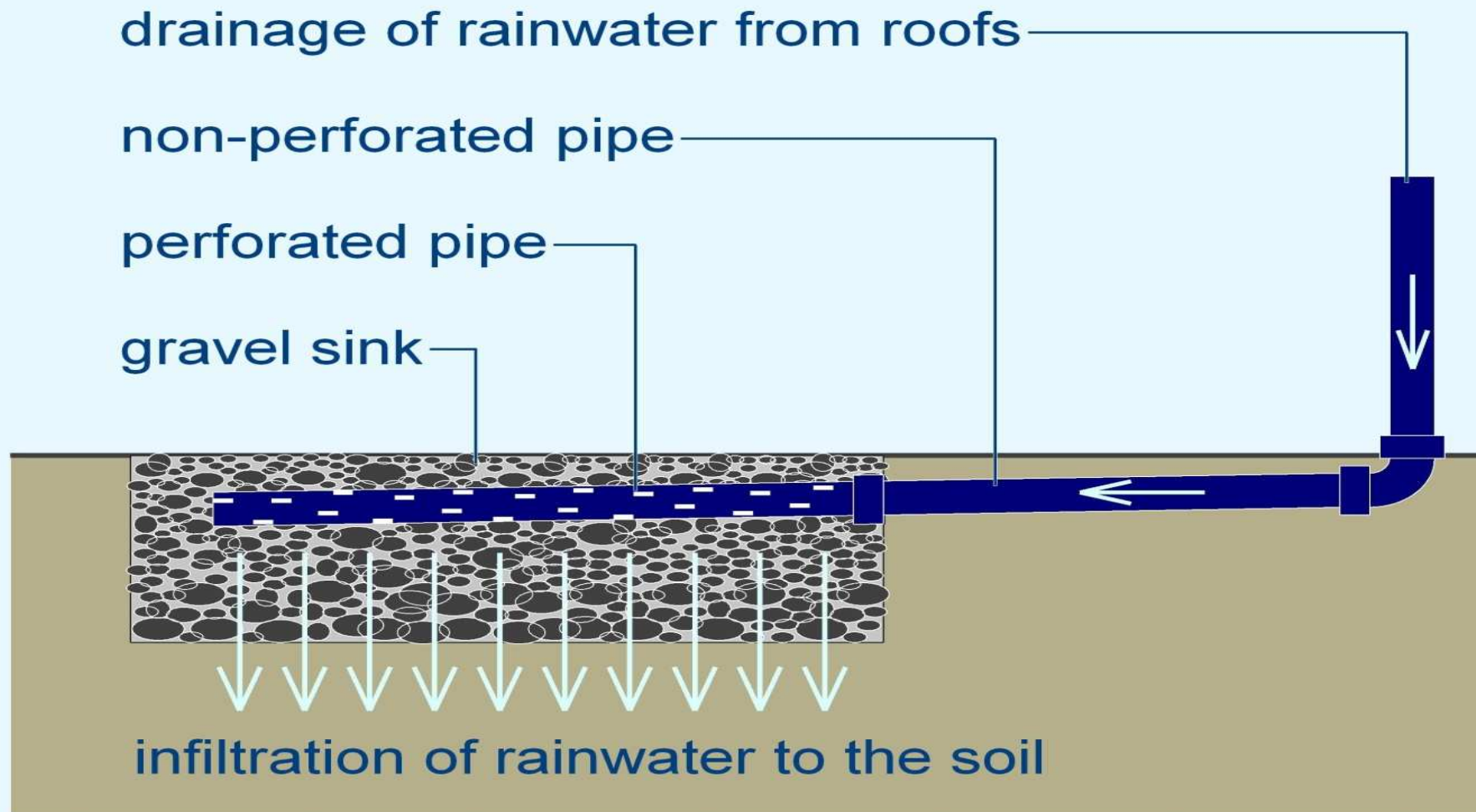


September, 16th 2006



**Restoration of water sources in urban zone Košice
People and Water, September 2006**

RAINWATER HARVESTING FROM ROOFS IN CITIES



Principle „Keep rainwater on the land“

MIKROŠTRUKTÚRY NA ZACHYTÁVANIE VODY V TERÉNE

1. VRSTEVNICOVÉ HRÁDZKY



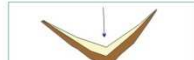
2. TERASY



3. POLOOBLÚKOVÉ HRÁDZKY



4. TROJUHOLNÍKOVÉ HRÁDZKY



5. OČNÉ TERASY



6. ŽLABOVÝ TYP MIKROPOVODÍ



7. JAMKOVÉ ŠTRUKTÚRY



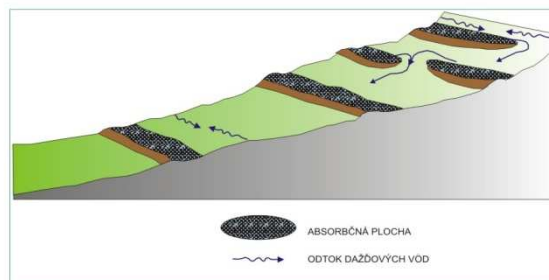
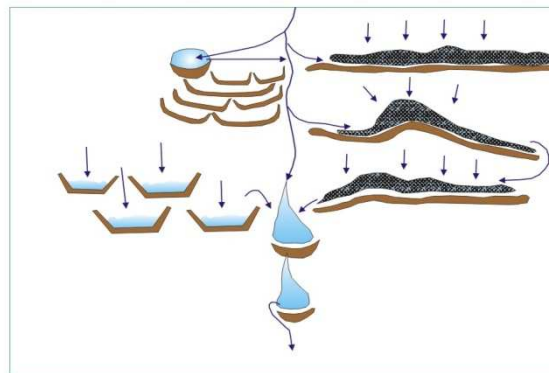
8. KAZETOVÉ ŠTRUKTÚRY MIKROPOVODÍ



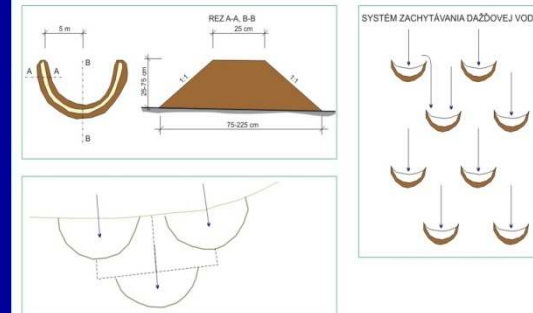
9. ŠACHOVNICOVÉ ŠTRUKTÚRY



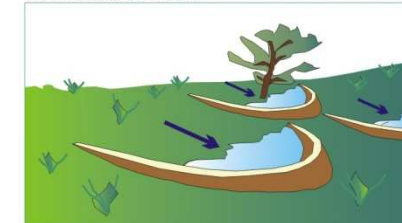
KOMBINÁCIA ROZNYCH TECHNÍK ZADRŽIAVANIA DAŽDOVÝCH VOD



POLOOBLÚKOVÉ HRÁDZKY



RIEŠENIE POLOOBLÚKOVÝCH HRÁDZOK



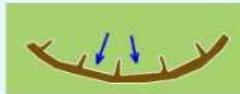
RIEŠENIE POLOOBLÚKOVÝCH HRÁDZOK



RAINWATER HARVESTING ON SLOPES

Microstructures for the rainwater harvesting on land

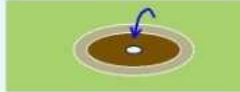
Contoured barrages



Terraces



Eyebrow terraces



Pits



Vallerani-type microcatchments



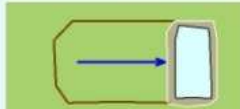
Semicircular bunds



Triangular bunds



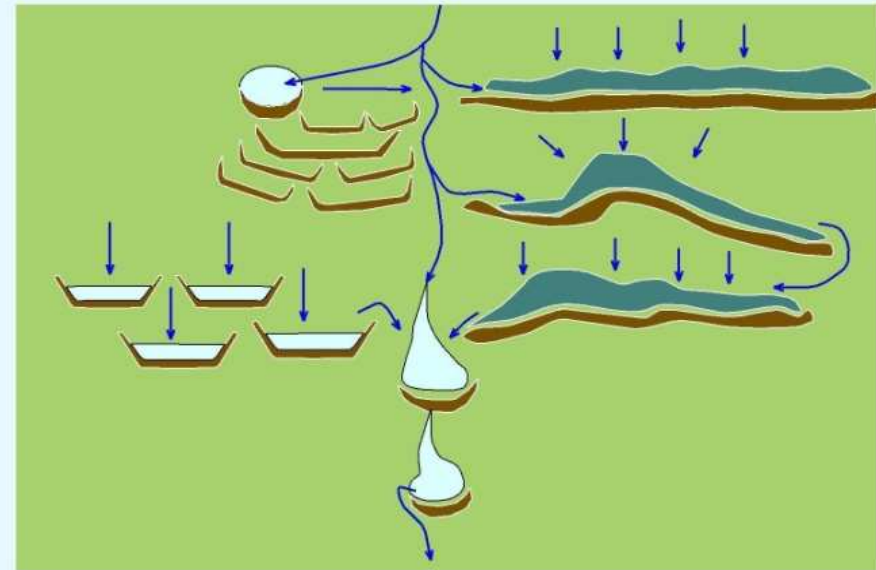
Meskat



Negarim



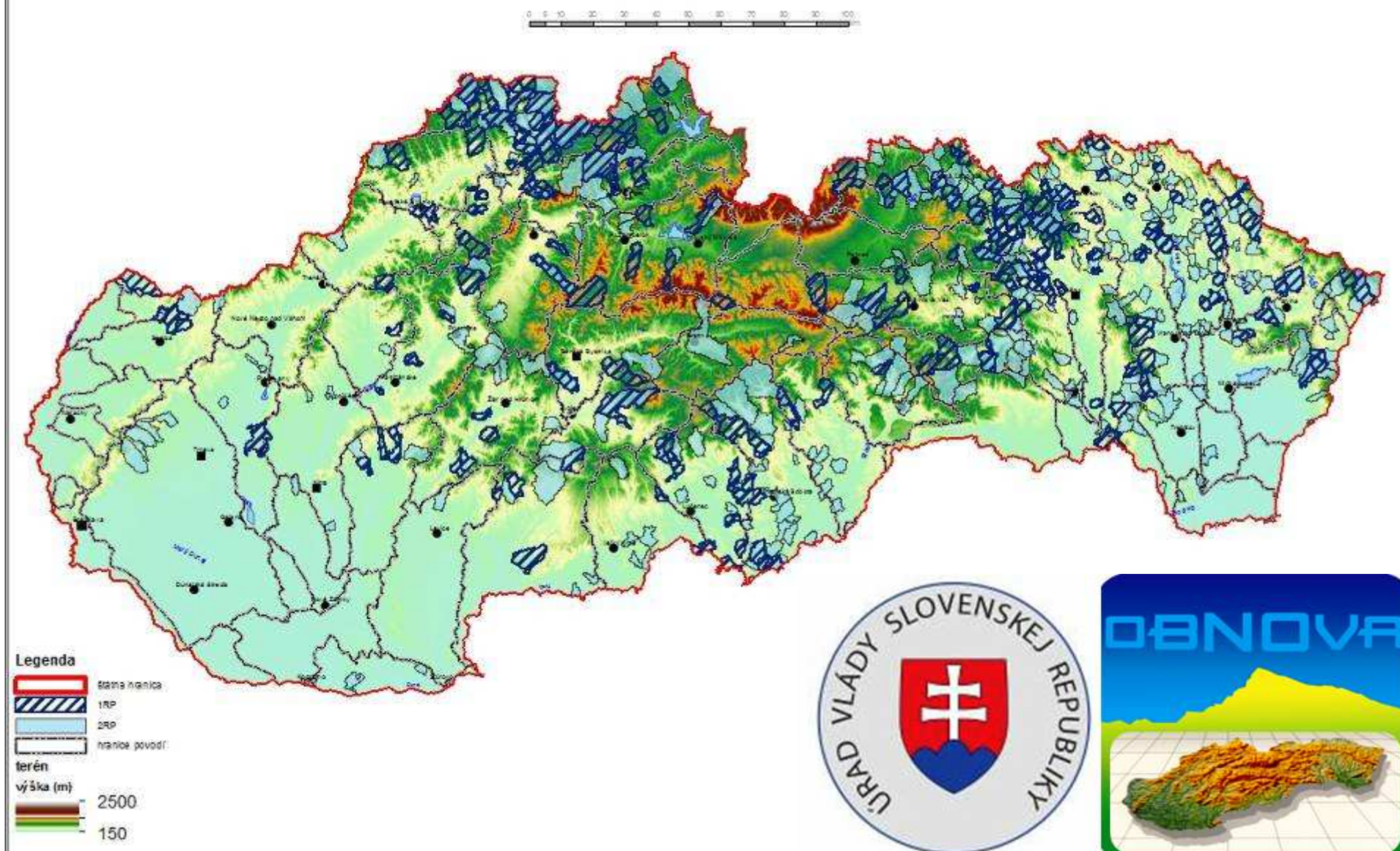
Combination of different rainwater harvesting technologies



absorption area
earthen levee
runoff of water



488 communities involved in the Government Landscape Restoration Program in 2011



ŤAHANOVCE





Snežnica



Hlohovec



Hlohovec









THE SLOVAK NEW WATER DEAL



MICHAL KRAVČÍK A KOLEKTÍV

Po nás púšť a potopa?

After us, the desert and the deluge?

1. More than 100.000 measures in 488 communities
2. More than 10 mil. m³ of waterholdings
3. More than 8.000 jobs for poor people

Hydro-Climate Recovery

Rainwater Storage in damaged landscape



LIFE11 ENV/SK/1019,





Legenda

Využitie územia

- TTP a ostatné plochy
- les
- orná pôda

- miestna komunikácia
- ostatné komunikácie
- toky
- suché toky

Administratívne hranice

- hranica obce
- zastavané územie obce

0 0.25 0.5 0.75 1 km



**SLOVENSKÁ
VOĽOVÁ**

Slovenská Volová



Legenda

Využitie územia

TTP a ostatné plochy

les

orná pôda

miestna komunikácia

ostatné komunikácie

toky

suché toky

Administratívne hranice

hranica obce

zastavané územie obce

Vodozdržné opatrenia

poldre, valy

dažďové záhrady

kamenné hrádzky

odrážky

hrádzky

zasakovacie pásy

0 0.25 0.5 0.75 1 km



One village - SLOVENSKÁ VOLOVÁ

- 142 soft measurements
- 8 uneployments
- 5 months

Image © 2014 CNES / Astrium
© 2014 Google

Google earth

Types of measurements in landscape



Summary in 2013

1. Implemented 758 measurements,
2. 58 jobs for poor people
3. In 8 villages of one catchment area

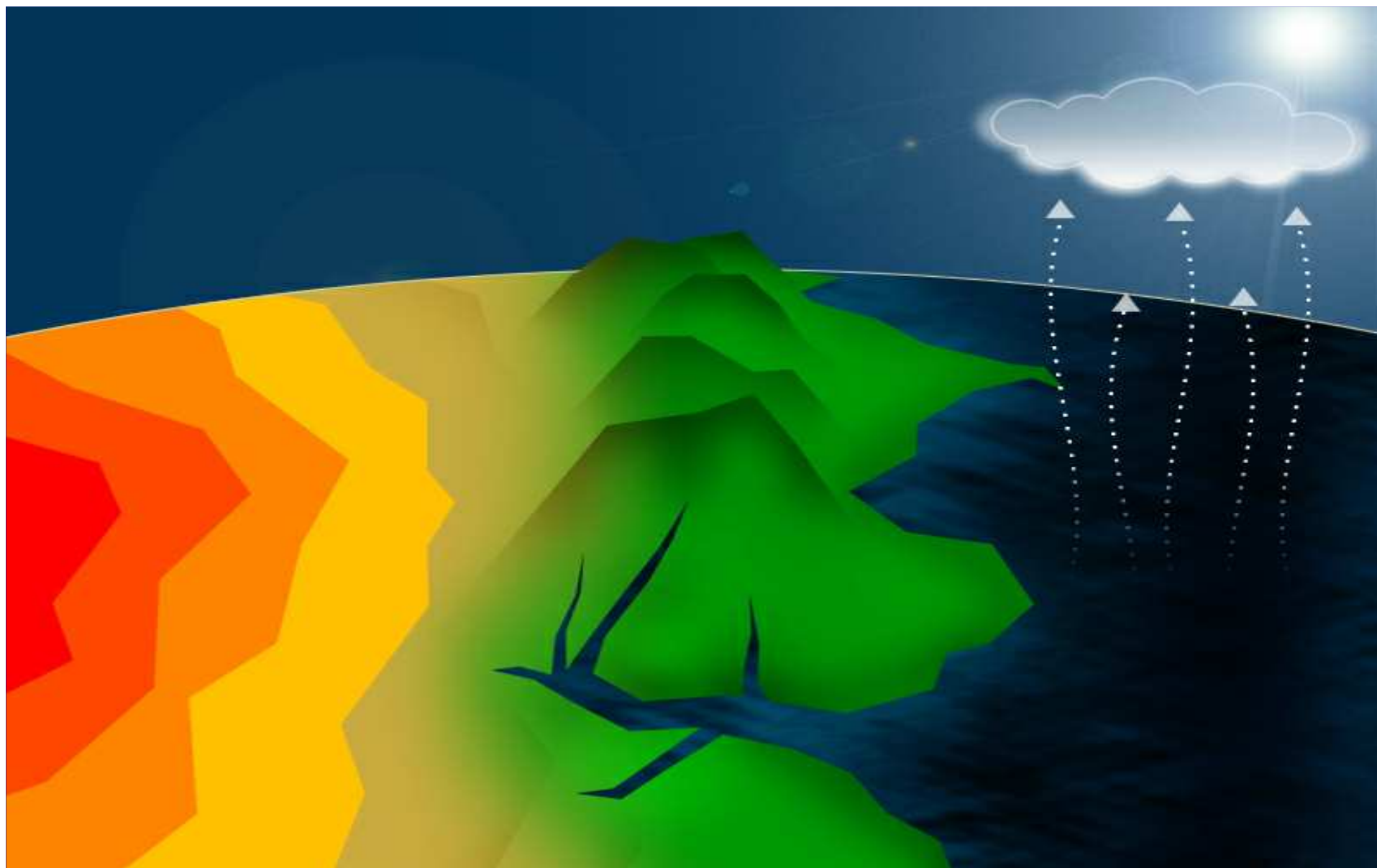


Solution for urban area



Rain gardens for urban zones

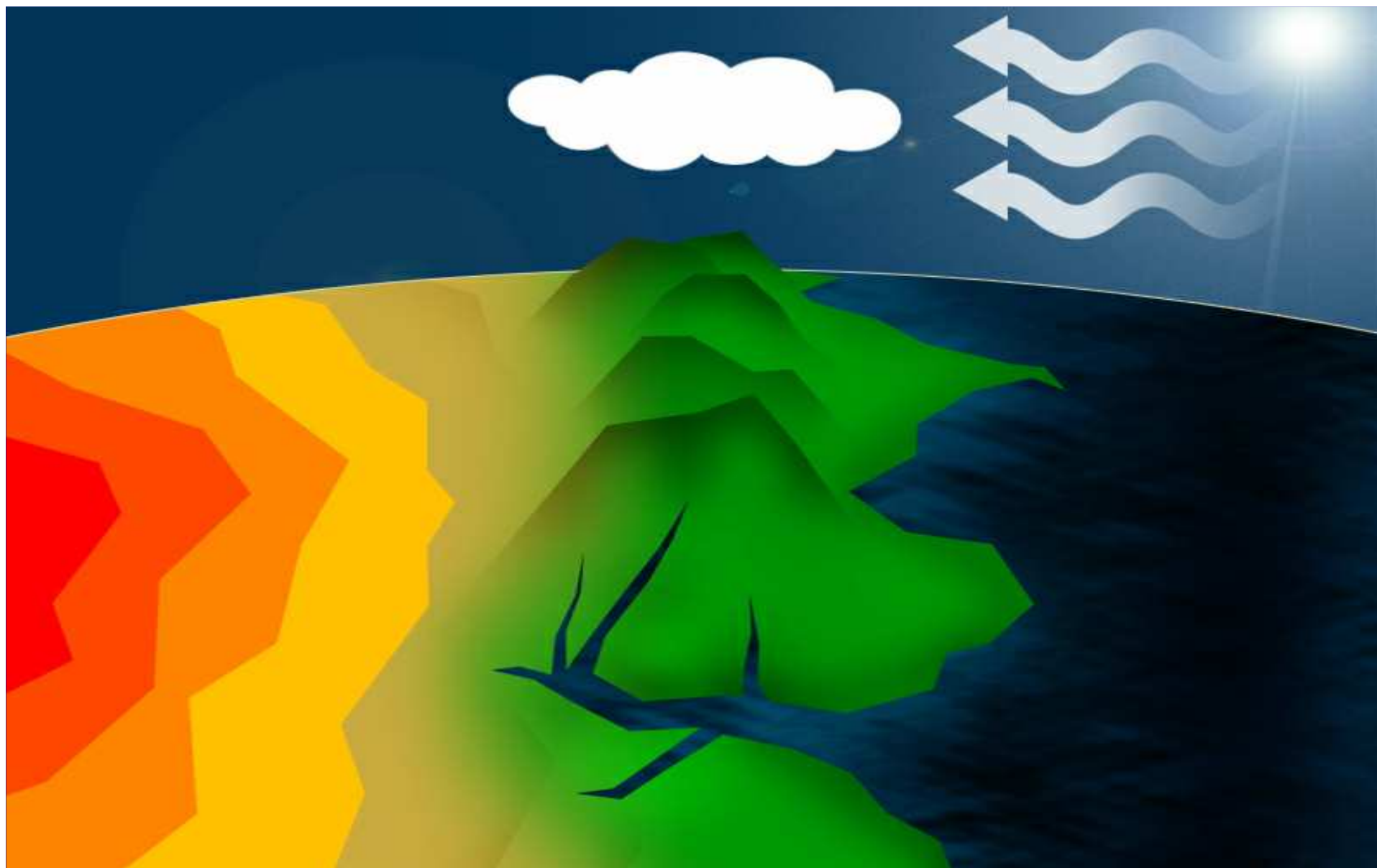




© NGO People and Water

Institute for Sustainable Watersheds

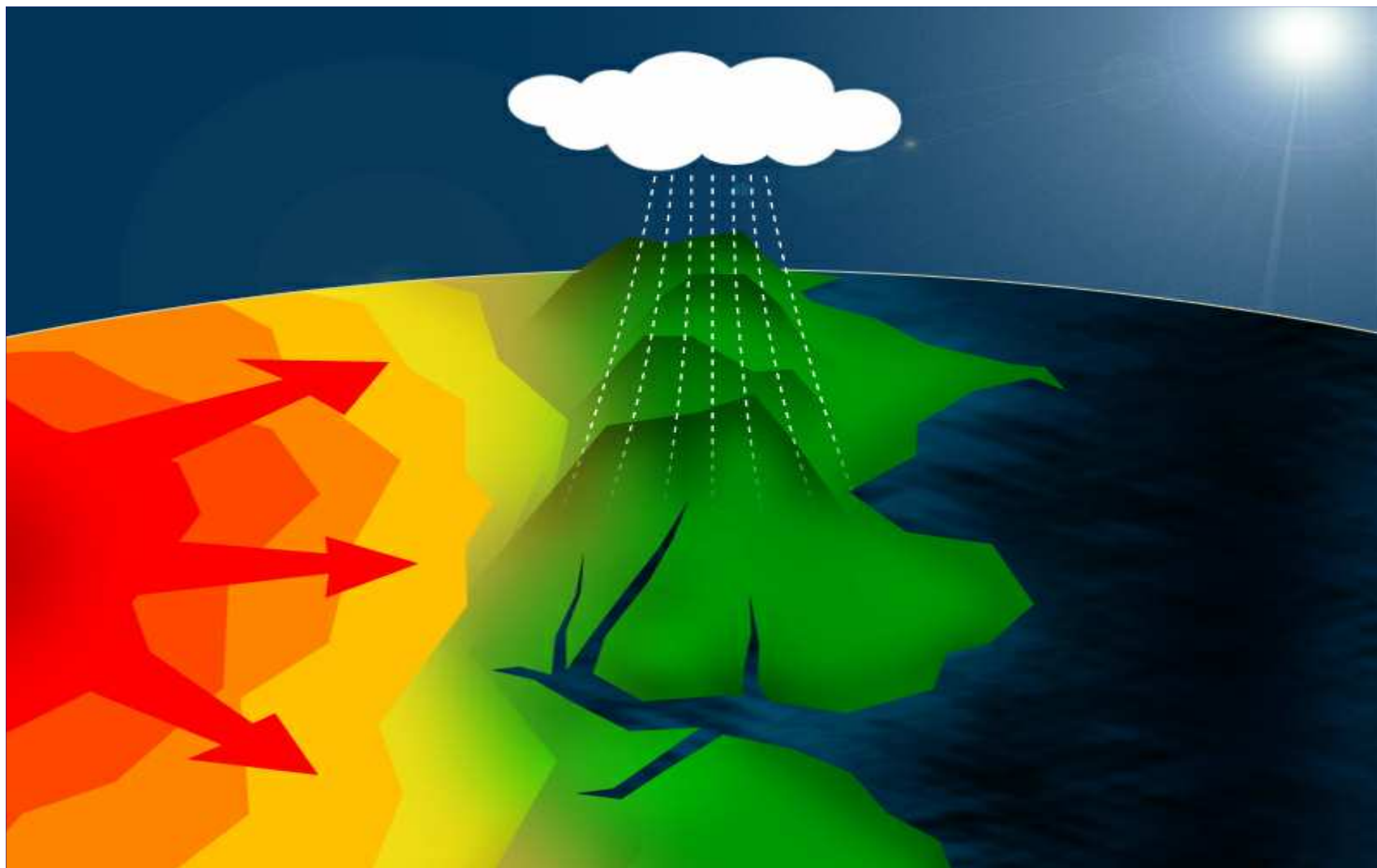
Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



© NGO People and Water

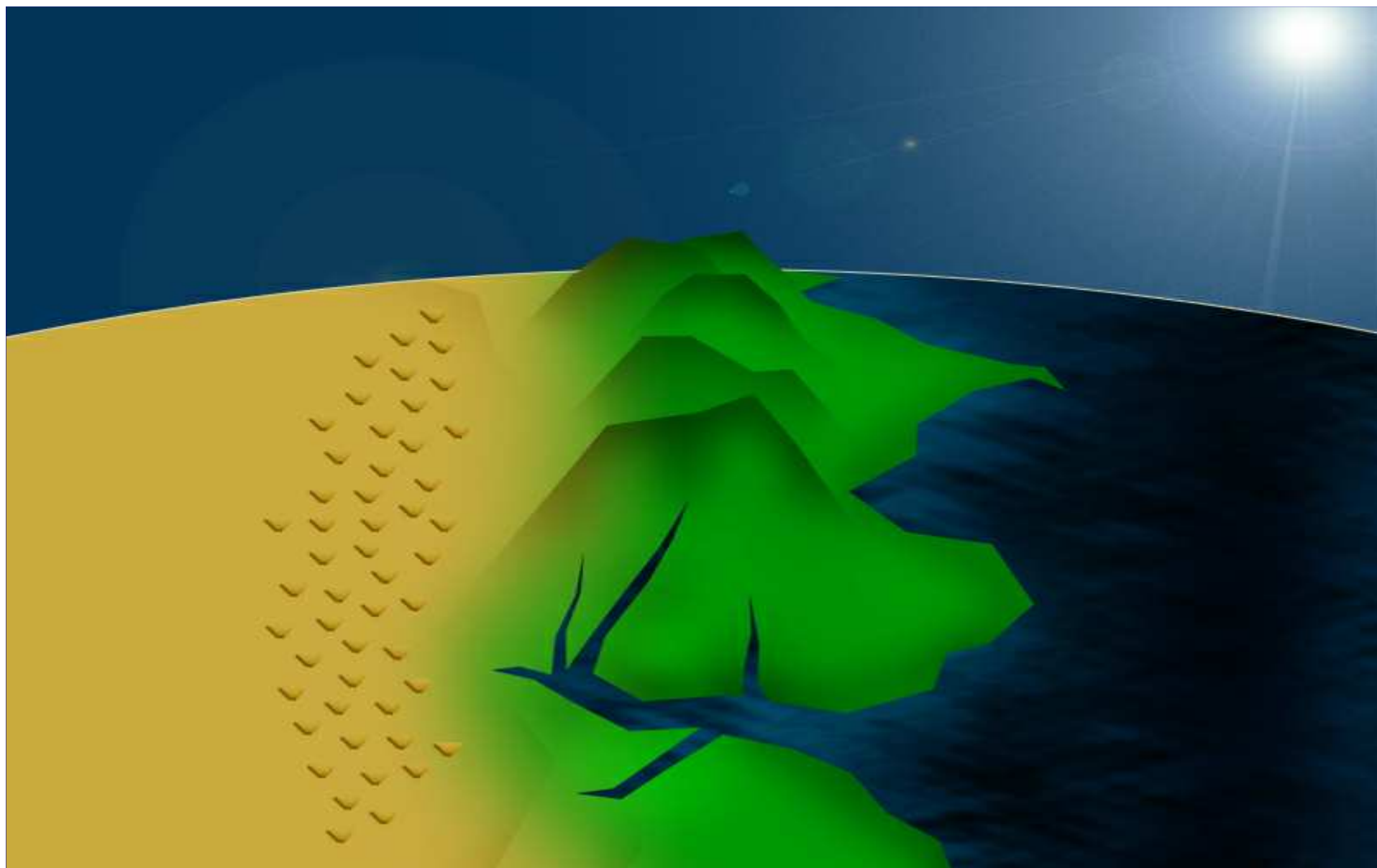
Institute for Sustainable Watersheds

Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



**© NGO People and Water
Institute for Sustainable Watersheds**

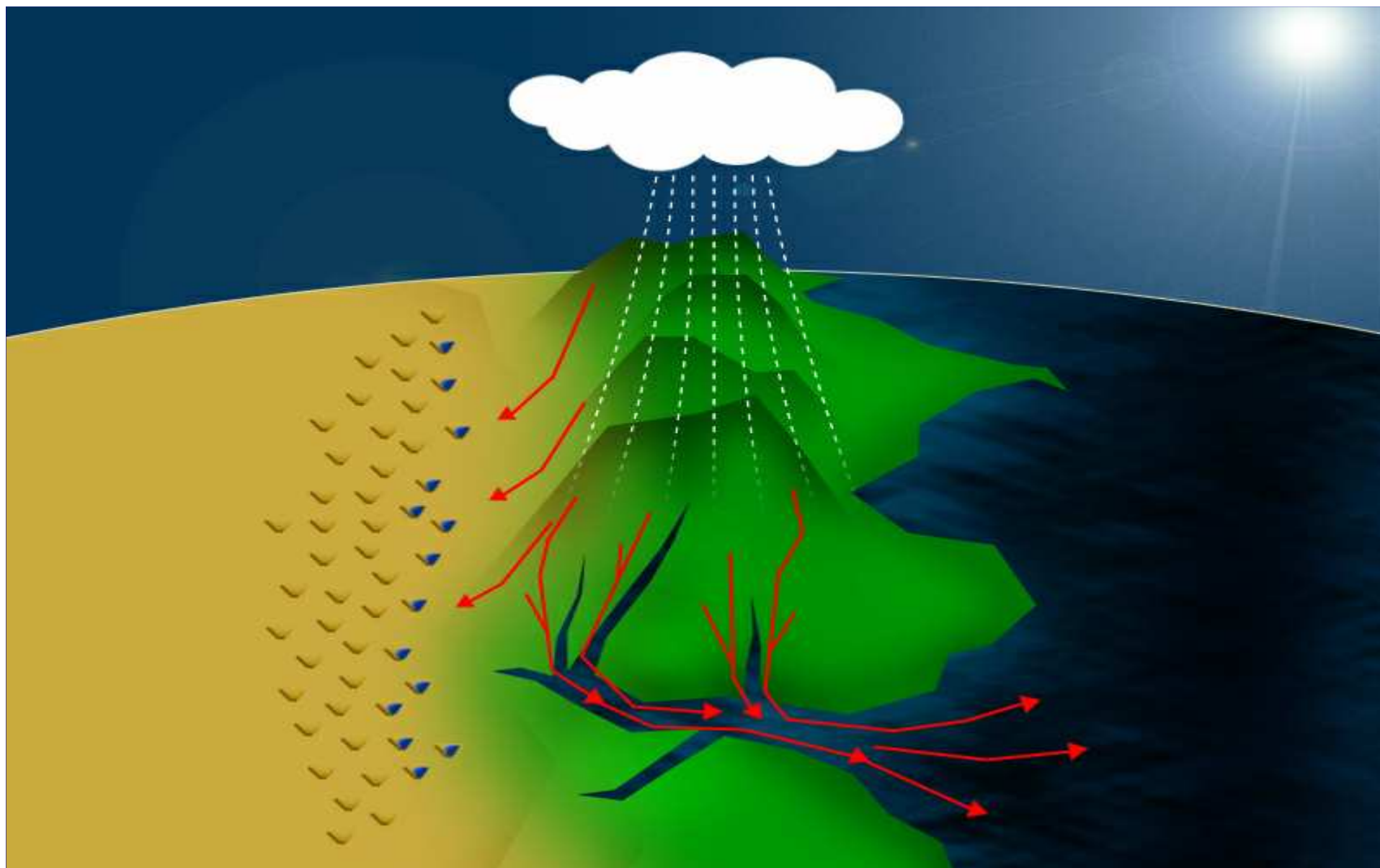
Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



© NGO People and Water

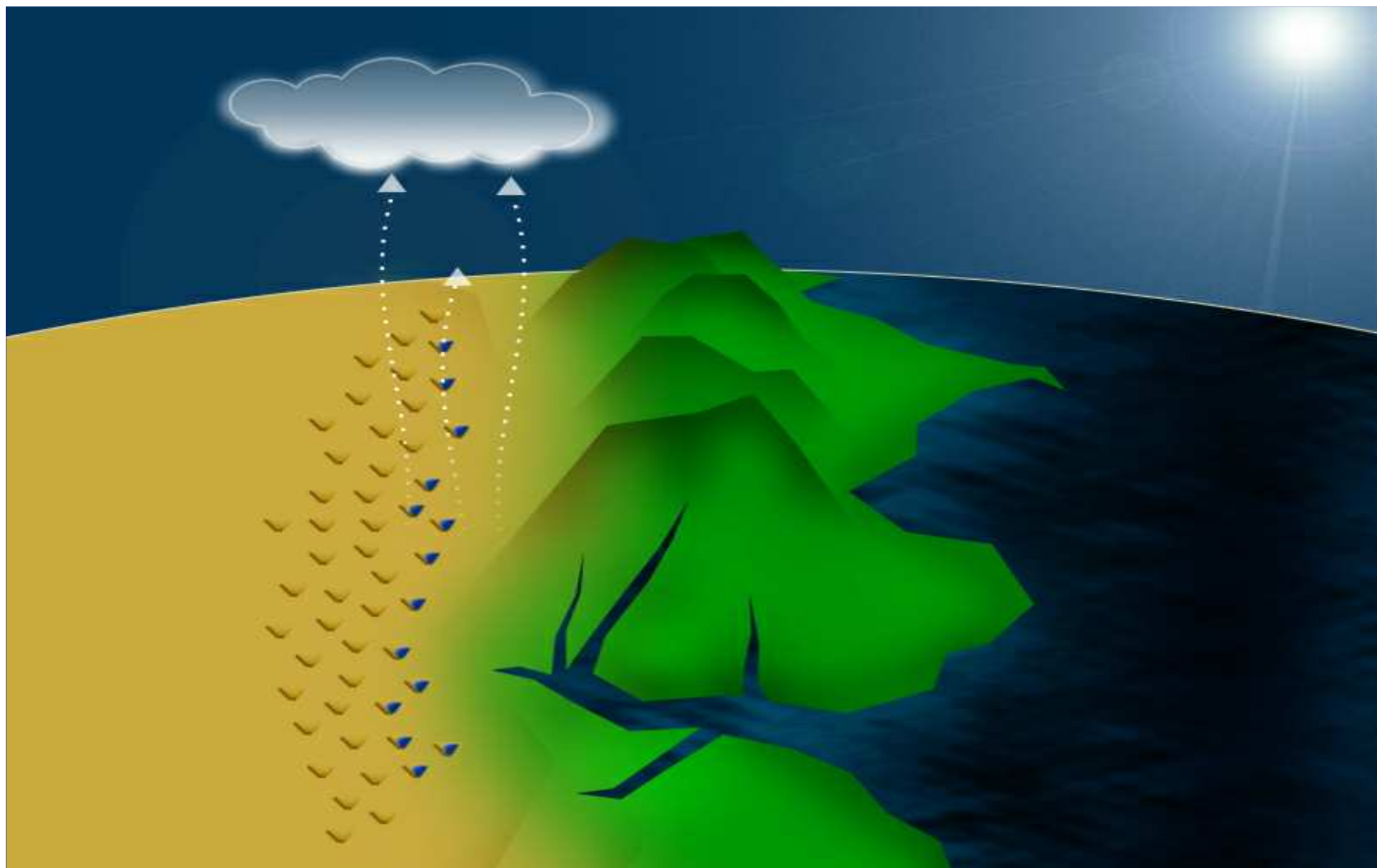
Institute for Sustainable Watersheds

Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



**© NGO People and Water
Institute for Sustainable Watersheds**

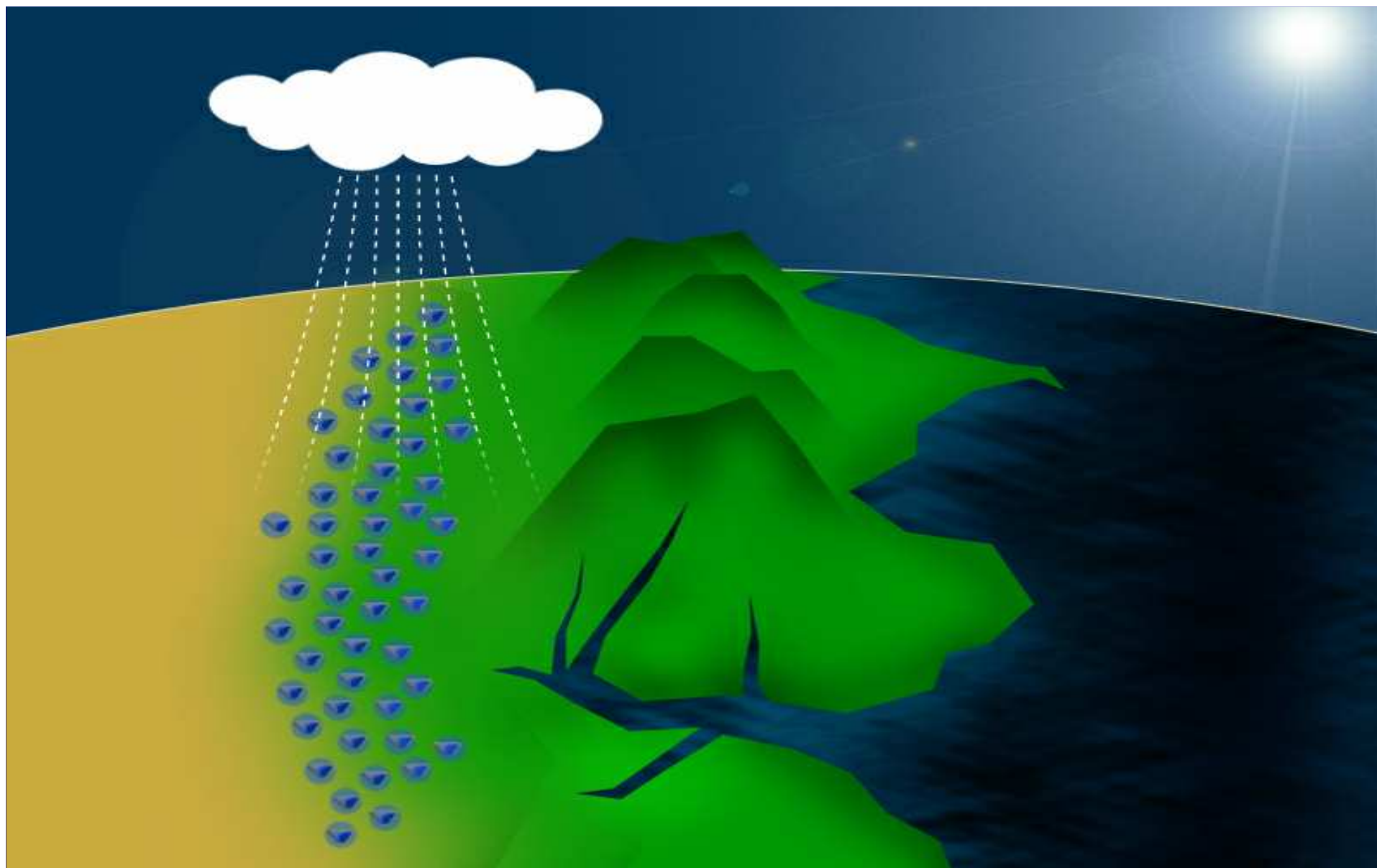
Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



© NGO People and Water

Institute for Sustainable Watersheds

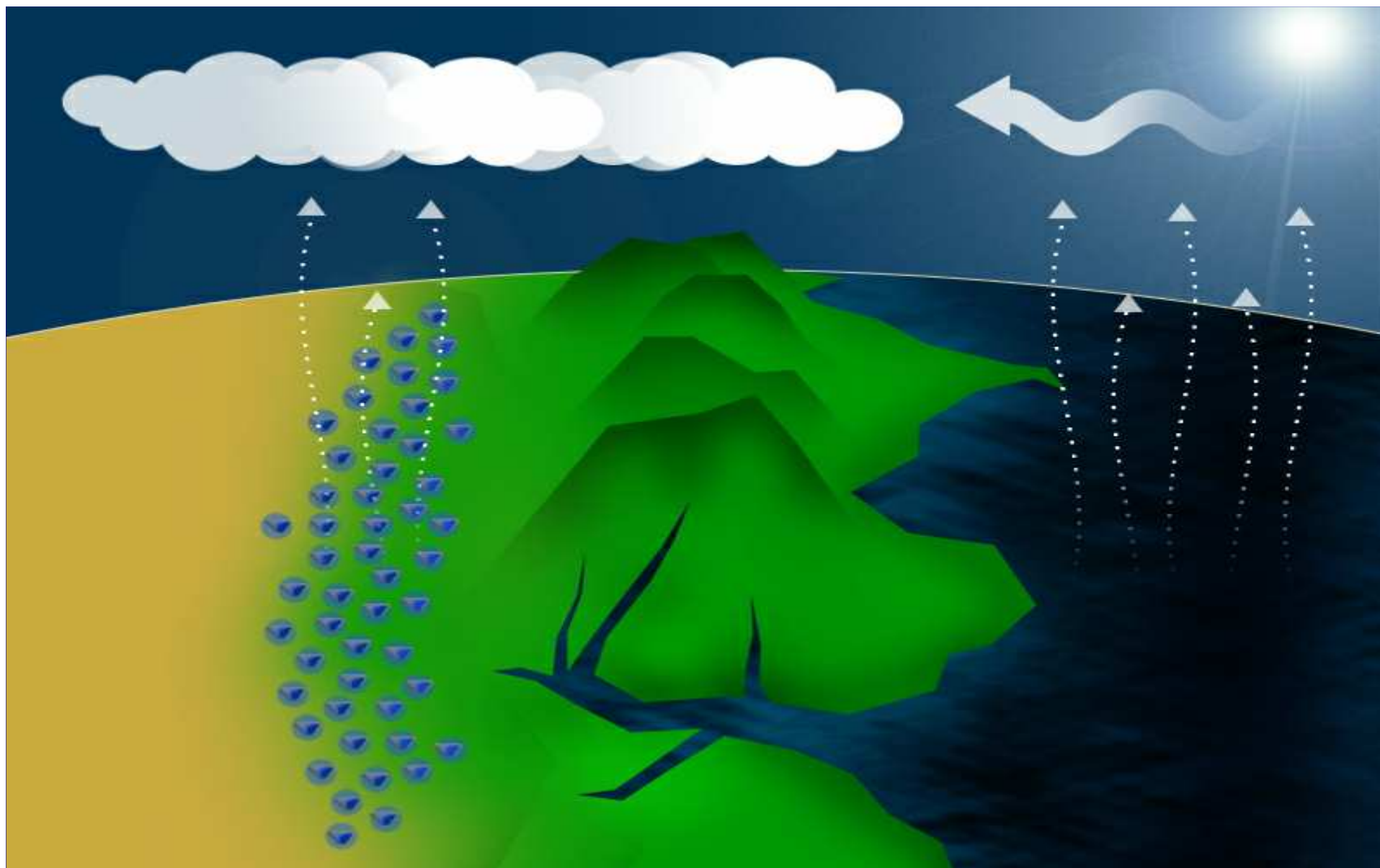
Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



© NGO People and Water

Institute for Sustainable Watersheds

Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



**© NGO People and Water
Institute for Sustainable Watersheds**

Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



© NGO People and Water

Institute for Sustainable Watersheds

Cermelska road 24, 040 01 Kosice, Slovakia Tel.Fax: +421 55 799 88 06-7, e-mail: ludiaavoda@ludiaavoda.sk, www.ludiaavoda.sk



THANKS!
ĎAKUJEM



www.waterparadigm.org

E-mail: kravcik@ludiaavoda.sk