Water Learning Webinar

Online Event for secondary schools & colleges across Africa

ISTP Pedagogic In Service Training Programme PCC CBC Cameroon

EDUCATION & TRAINING AFRICA

SoGE School of Geography and the Environment

ssee University of Oxford

UKRI Economic and Social Research Council

Agenda

1. Introduction
2. School presentation from *PCSS Bonamoussadi, Douala, Cameroon*
3. Panel presentations
4. Discussion / Q&A

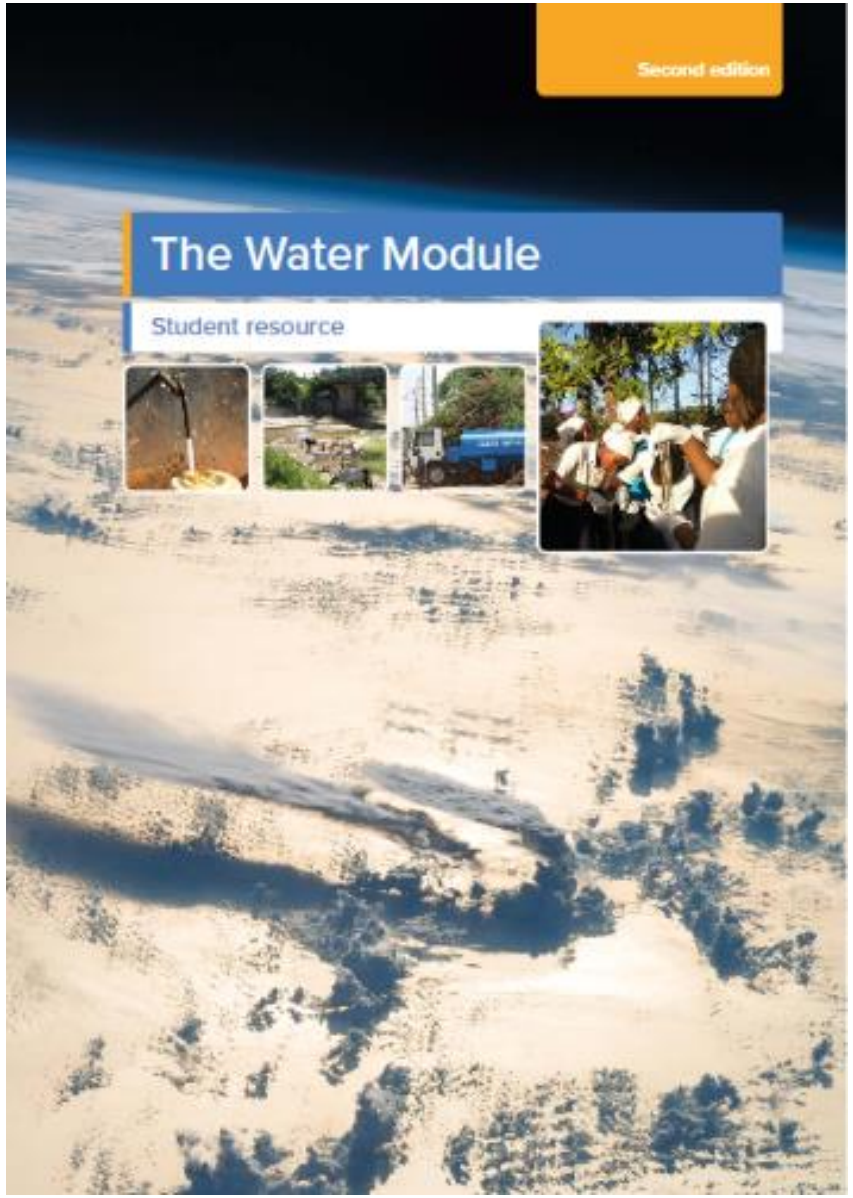
Moderators

Nancy Gladstone

Dr Saskia Nowicki

School of Geography and the Environment, University of Oxford

waterlearningpartnership.org



Welcome water learners!

Water Learning Webinar

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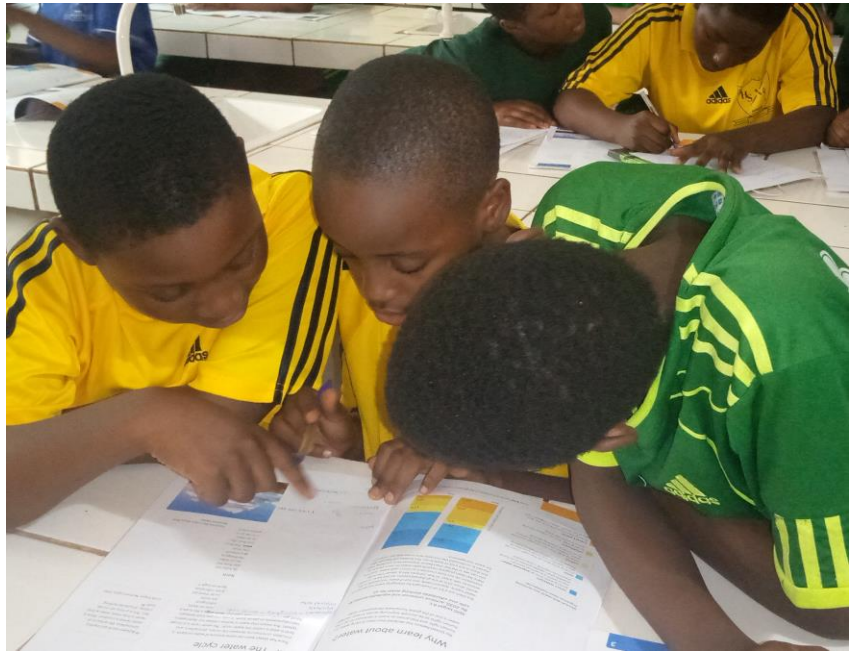

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BASE TITANIUM

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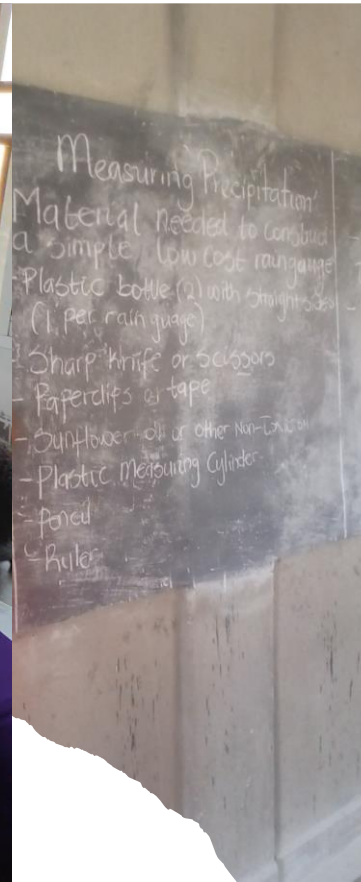
UNIVERSITY OF OXFORD

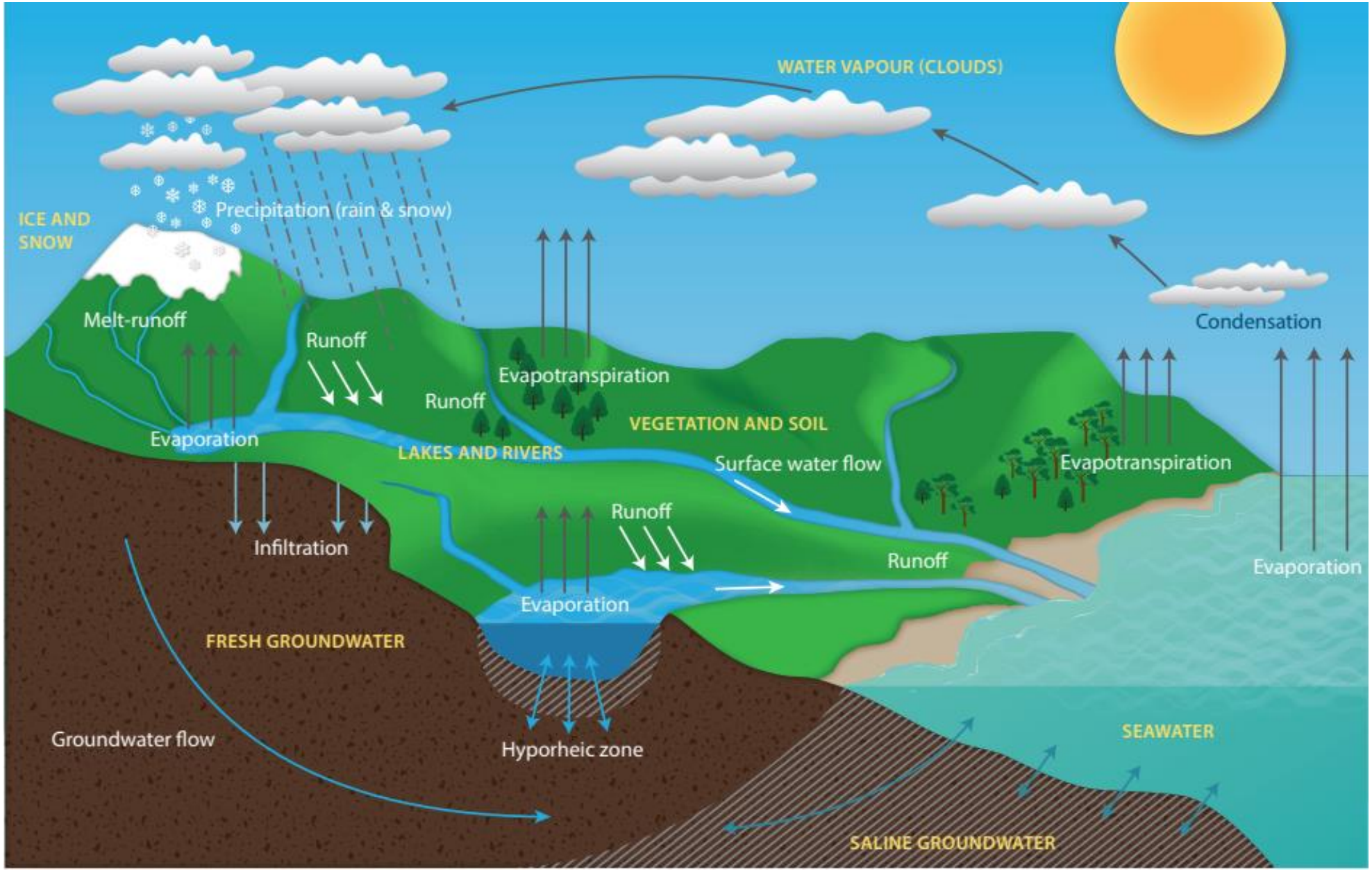
PCSS Bonamoussadi, Douala, Cameroon

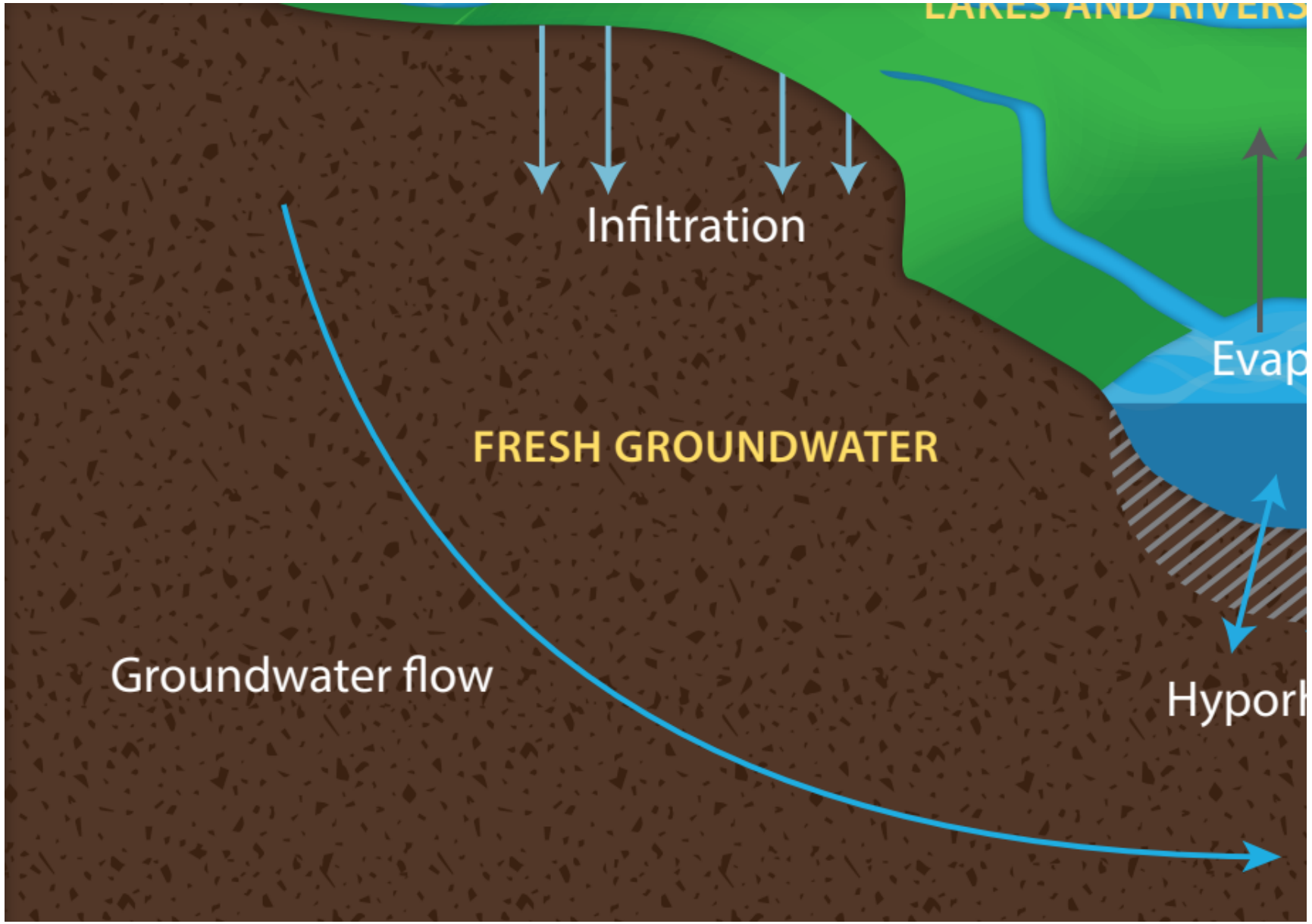
WATER LEARNING PARTNERSHIP PROJECT

PRESBYTERIAN COMPREHENSIVE SECONDARY SCHOOL BONAMOUSSADI DOUALA



THE WATER CYCLE





How water gets into the ground

Infiltration experiment

Materials

- Gravel, soil, and sand
- Bottle
- Pair of scissors
- Thread or twine
- Fine cloth

Infiltration experiment setup

- Add water
- Start the timer

Other Water Module learning activities include:
- observing evapotranspiration
- making a raingauge to measure precipitation

What is porosity?

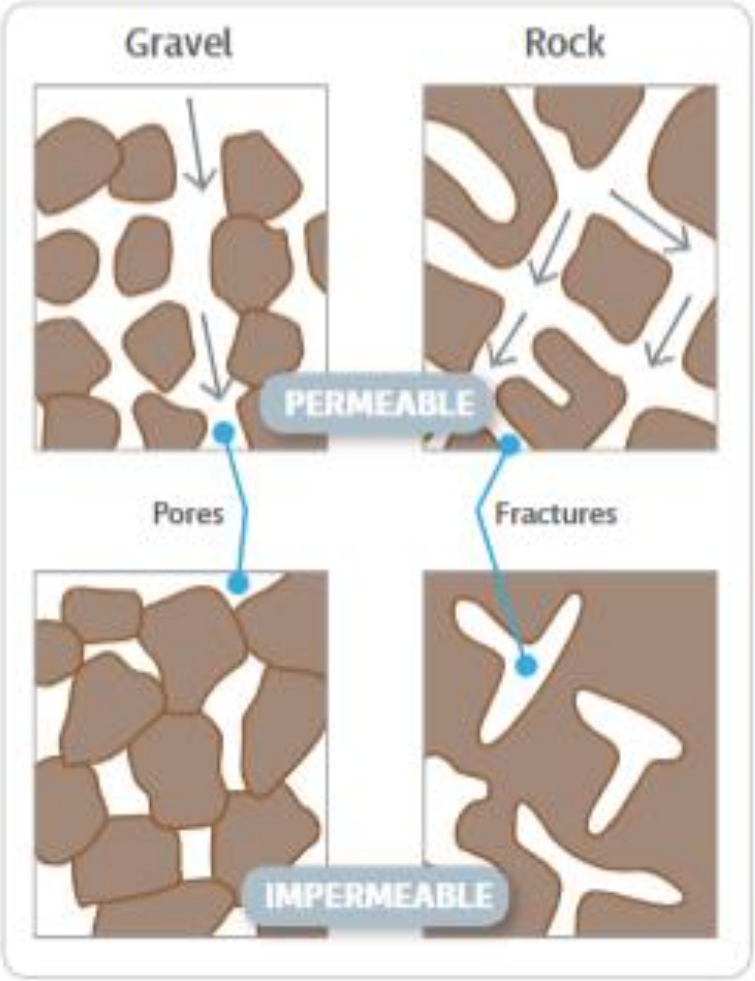
Even though it looks completely solid, there is actually a lot of void (empty) space in the ground.

$$\text{porosity} = \frac{\text{volume of void space in rock or sediment}}{\text{total volume of rock or sediment}}$$

What is permeability?

Water can move through the ground when the pore spaces and fractures are connected. If they are connected, water can find a path to flow through the space.

Permeability is a measure of how well the spaces are connected.



THANK YOU

Panel

Prof. Daniel Olago
University of Nairobi

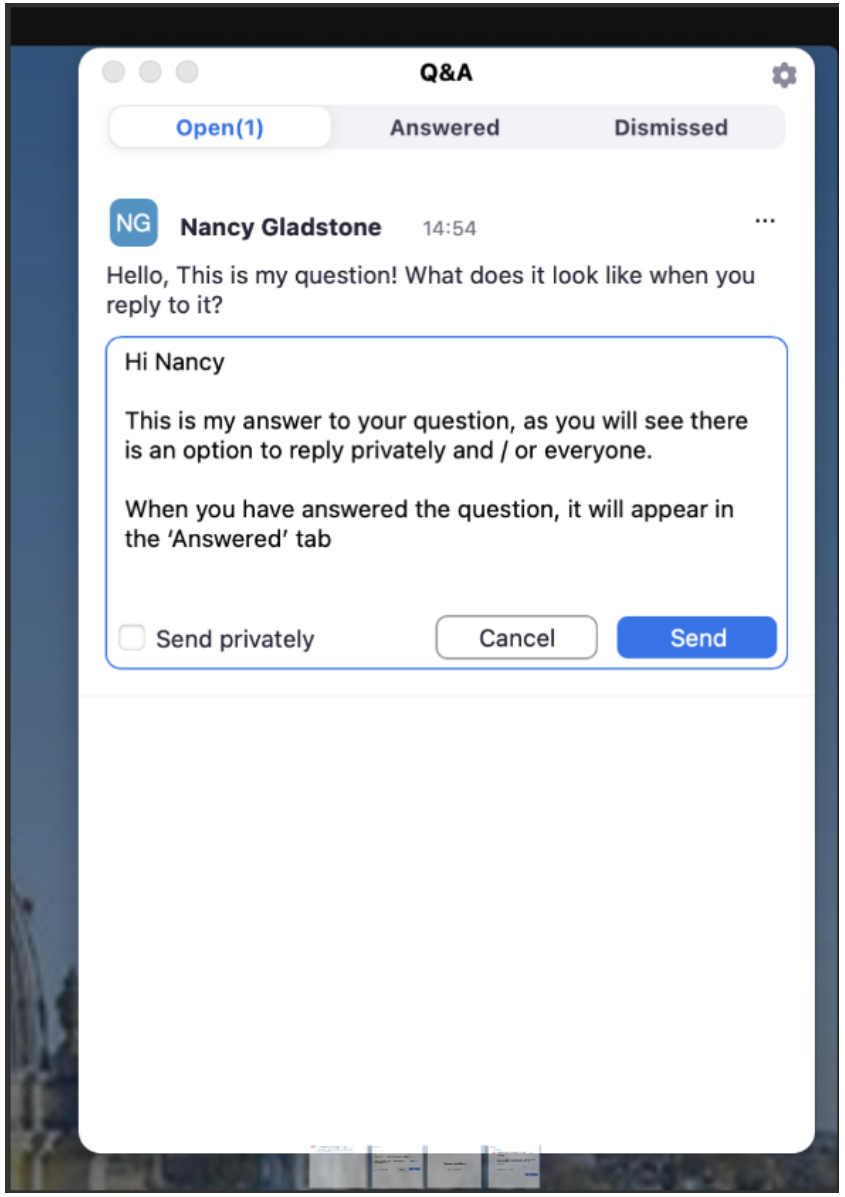
Prof. Viviana Re
University of Pisa

Dr Ellen Dyer
University of Oxford

Dr Wilfried Pokam
University of Yaoundé I

Q and A

Please amend your name to your institution or tick anonymous question if you are under 18 or do not agree to show your names to other participants.



Socio-hydrogeology: the science of people and groundwater

Re Viviana, PhD

Earth Sciences Department, University of Pisa

viviana.re@unipi.it @biralnas

Which is the quality of the water?

Can we predict variations in annual recharge?

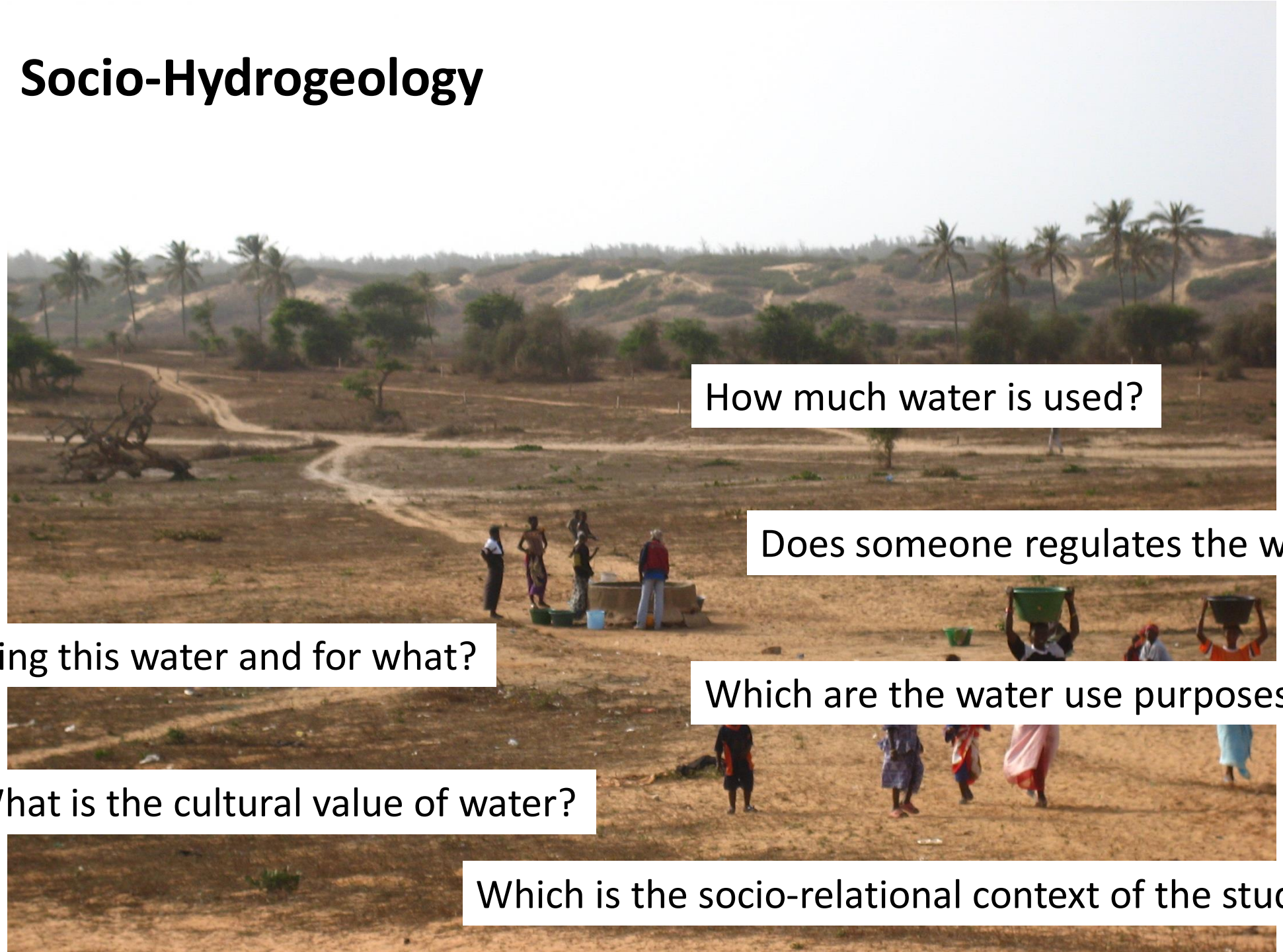
Which are the recharge rates?

Which are the main pollution sources?

Where does the water come from?

Which are the hydrogeological settings of the region?

Socio-Hydrogeology



How much water is used?

Does someone regulates the water use?

Who is using this water and for what?

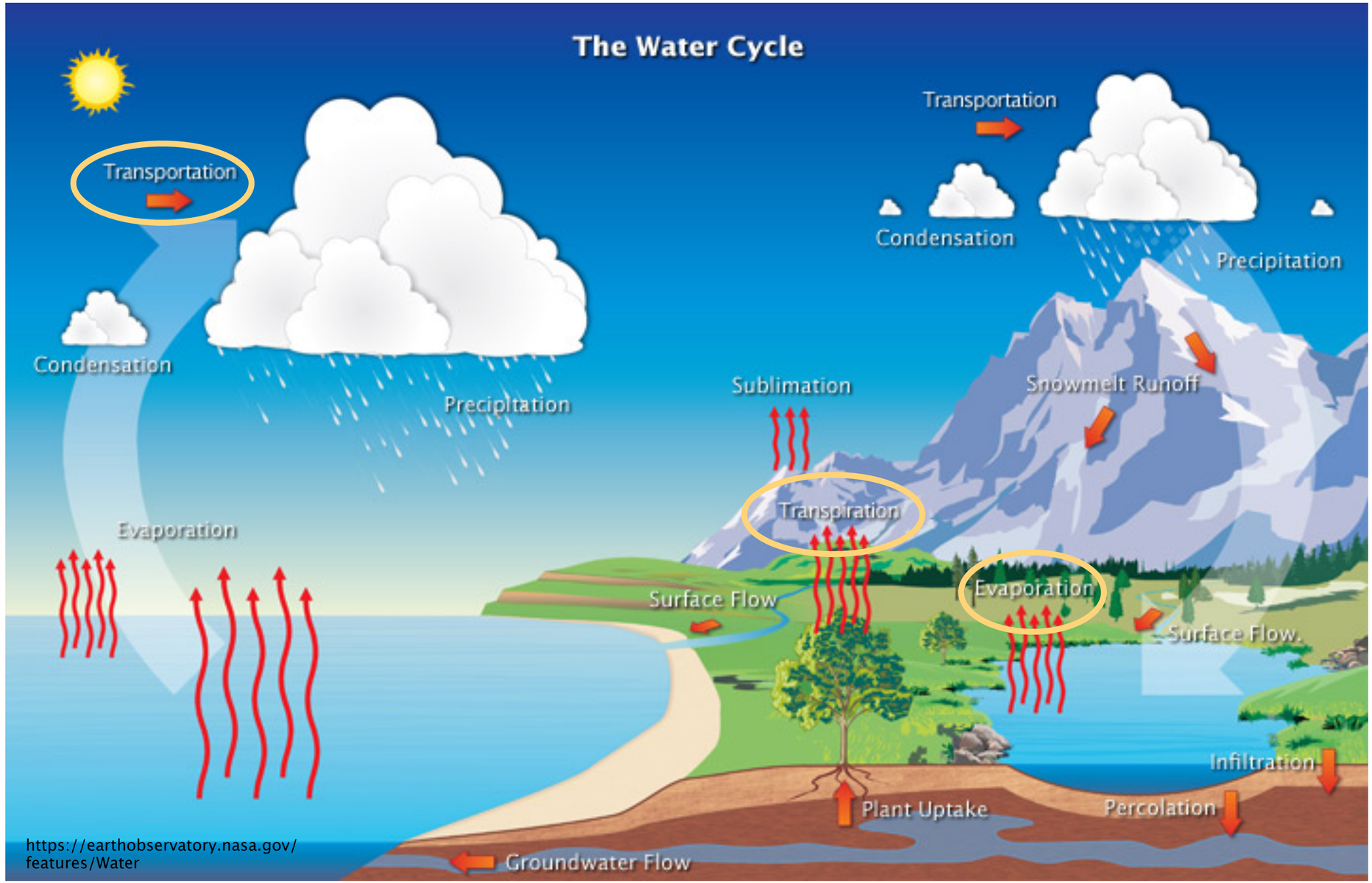
Which are the water use purposes?

What is the cultural value of water?

Which is the socio-relational context of the study area?

Socio-Hydrogeology

Back to the water cycle… from the ground up!



Variation in the water cycle

- Extreme storms
- Seasonal rainfall
- Precipitation types
- Geographic differences
- How does the water cycle vary where you live?


https://eden.cce.cornell.edu/natural-hazards/winter-storms/


https://wwf.panda.org/wwf_news/?206219/Global-warming-can-intensify-tropical-rainfall

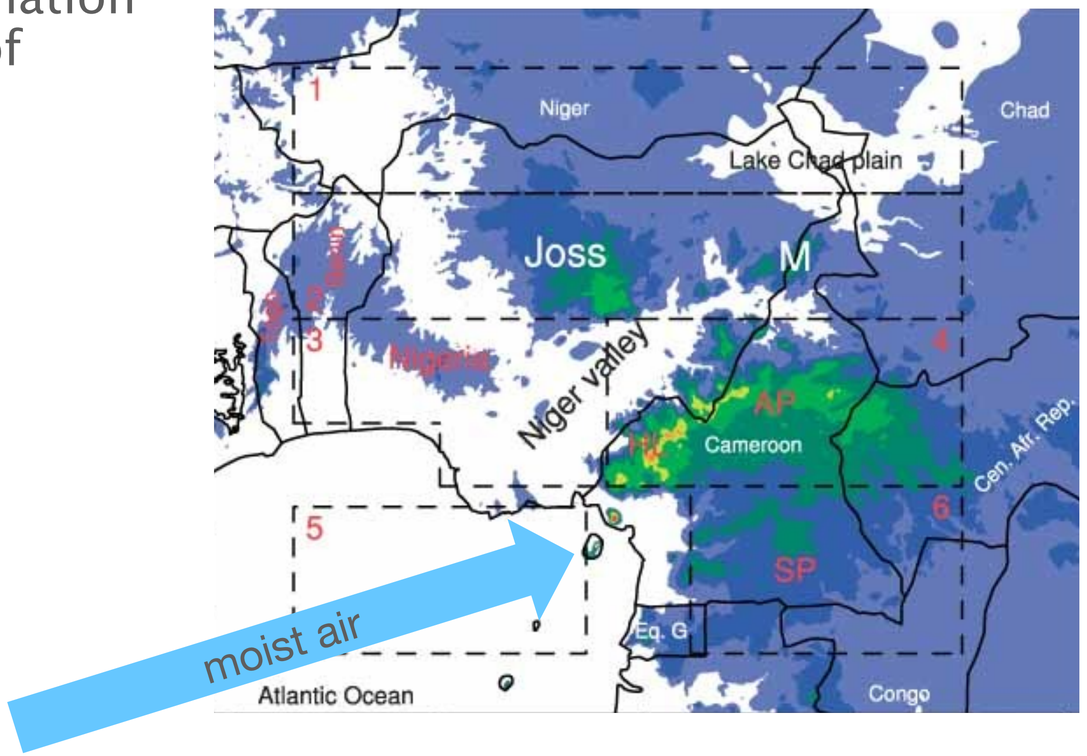

https://groups.seas.harvard.edu/climate/eli/research/equable/ccf.html


https://en.wikipedia.org/wiki/Lake_Turkana

What features of the local climate cause rainfall variability or seasonality in Cameroon?

- Topography : air rise and cool leading to cloud
- Moist air from the Atlantic ocean.

Debundscha a village in the south-western Region is among the rainiest region in the word, as a combination moist air from Atlantic and uplifts in the see saw of Mount Cameroon



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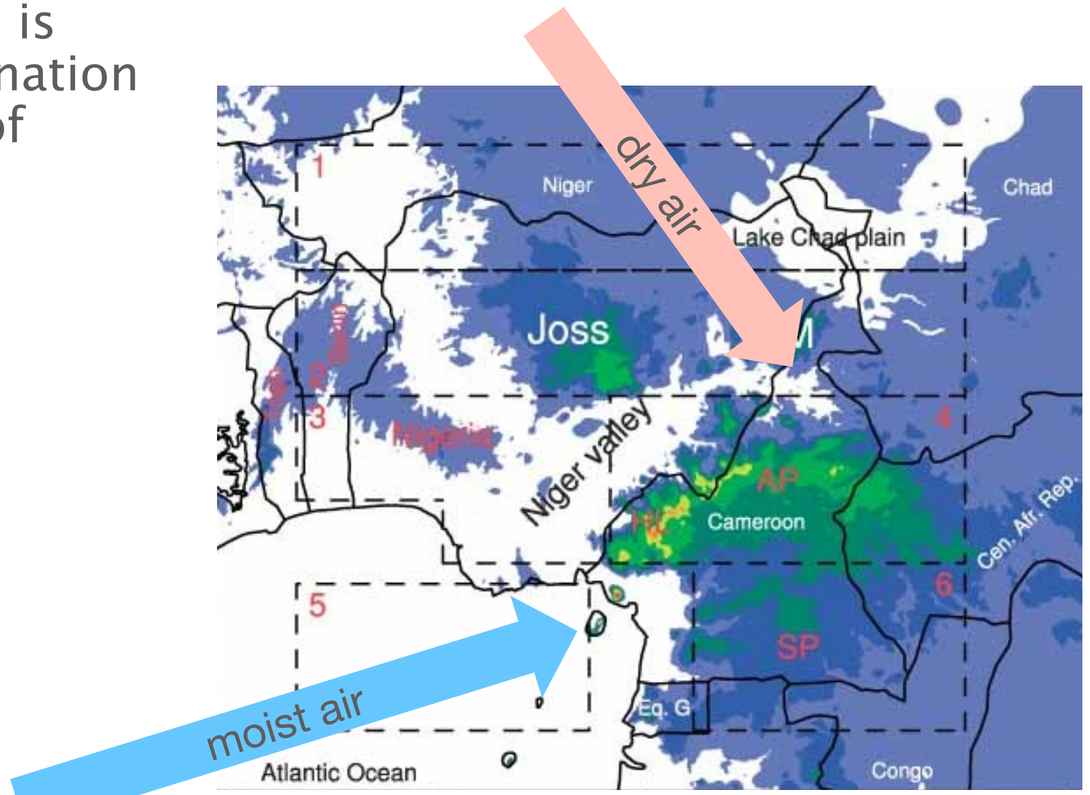
- Dry air from the Sahara desert
- African Easterly Jet : wind of strong magnitude blowing at around 4 km above the ground



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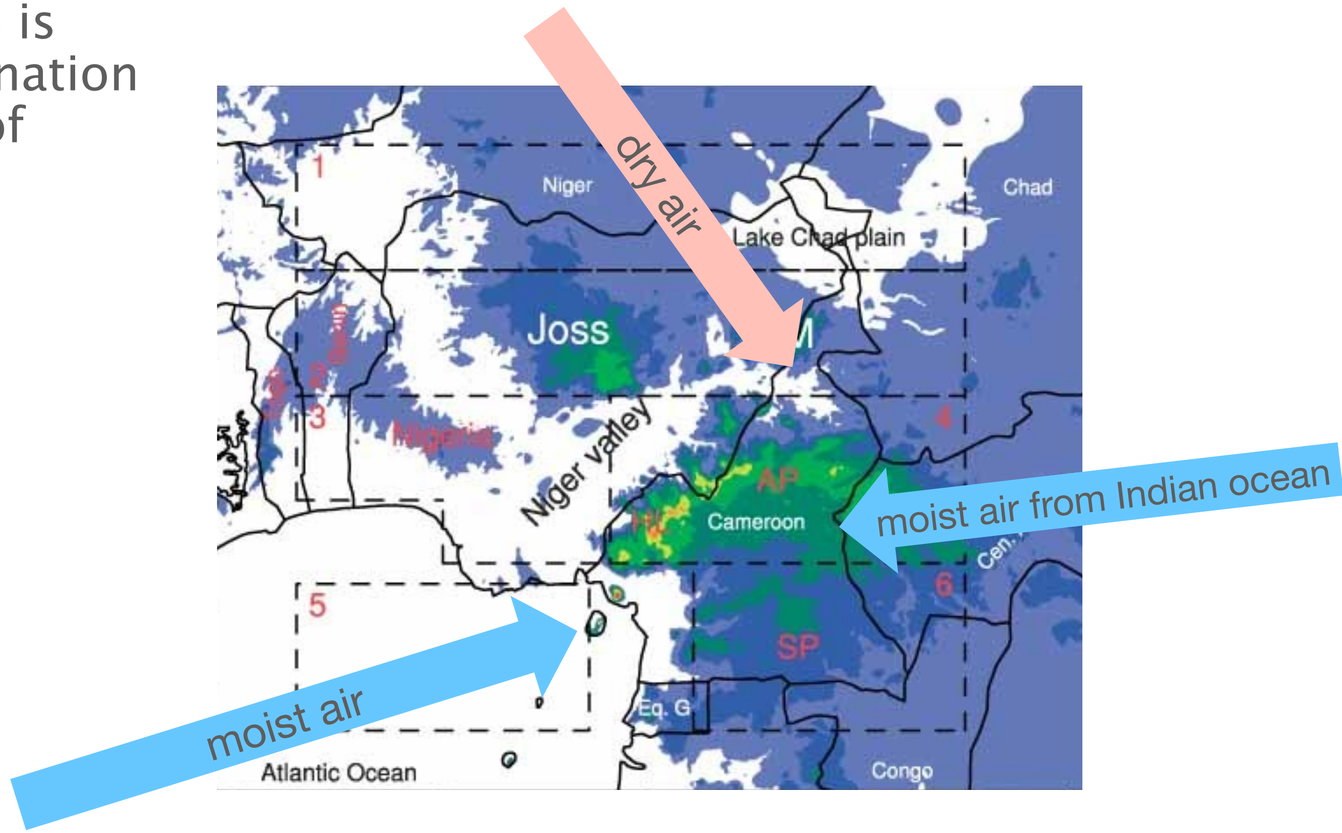
- African Easterly Jet : wind of strong magnitude blowing at around 4 km above the ground
- Moist air from Indian ocean
- Moist air evaporated from deep forest across southern Cameroon

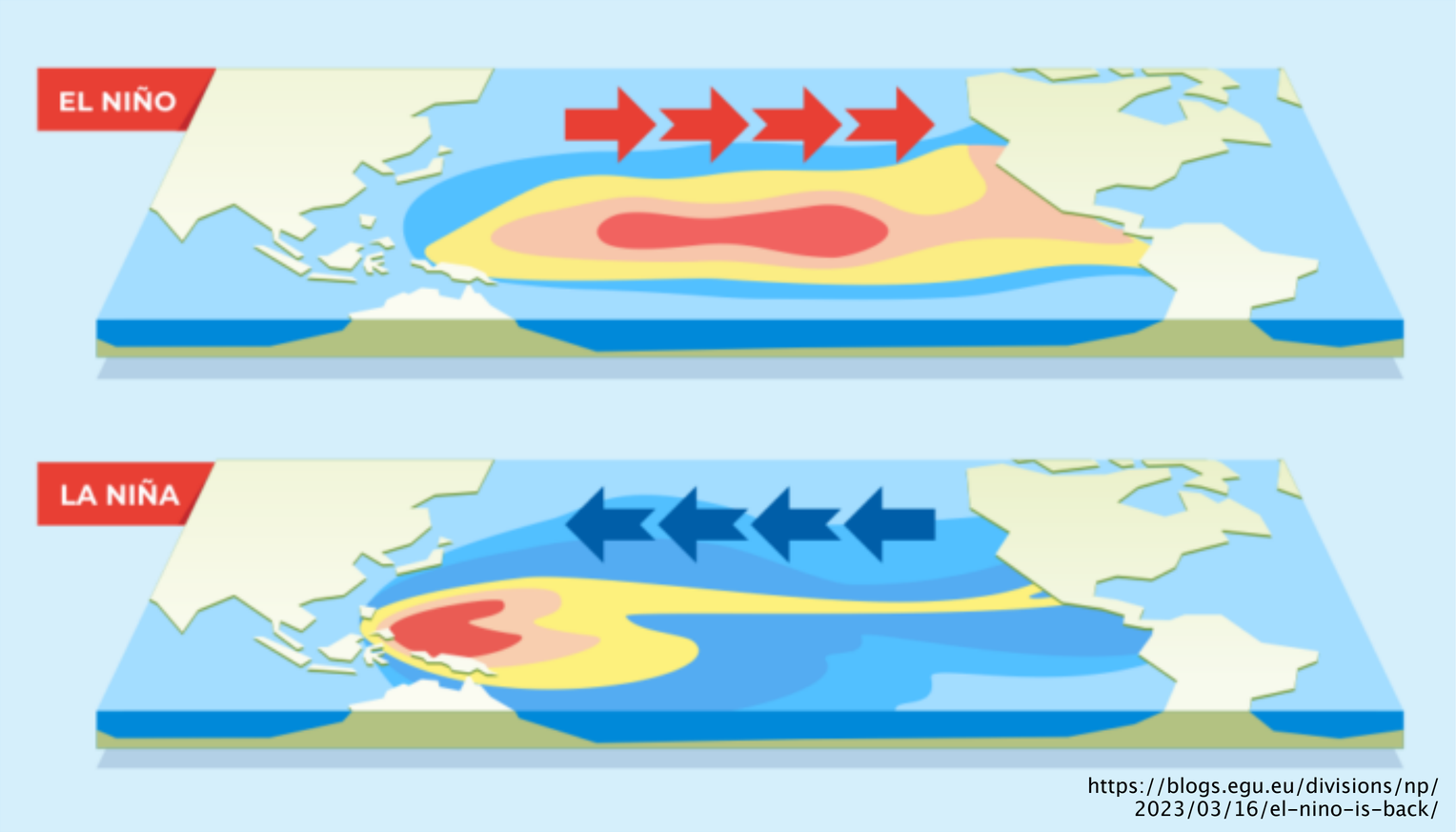


How is local climate and rainfall affected by large scale climate?

- Local atmospheric conditions can be influenced by the climate in other parts of the word – this is called a teleconnection

- Important example :

  El Niño Southern Oscillation



https://blogs.egu.eu/divisions/np/2023/03/16/el-nino-is-back/

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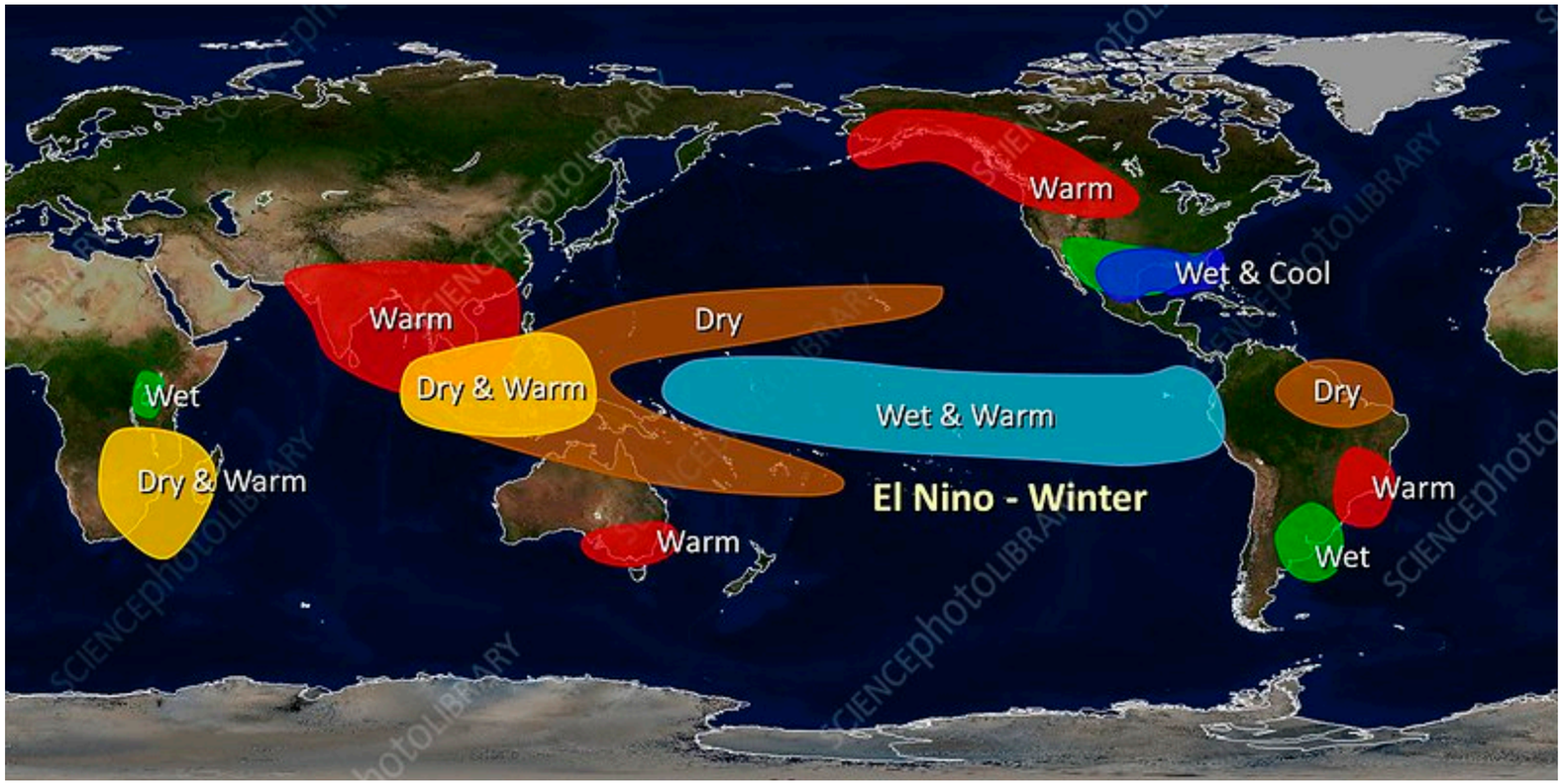
  El Niño Southern Oscillation

- Changes in winds and ocean temperature in the Pacific also influence temperature and winds in other regions

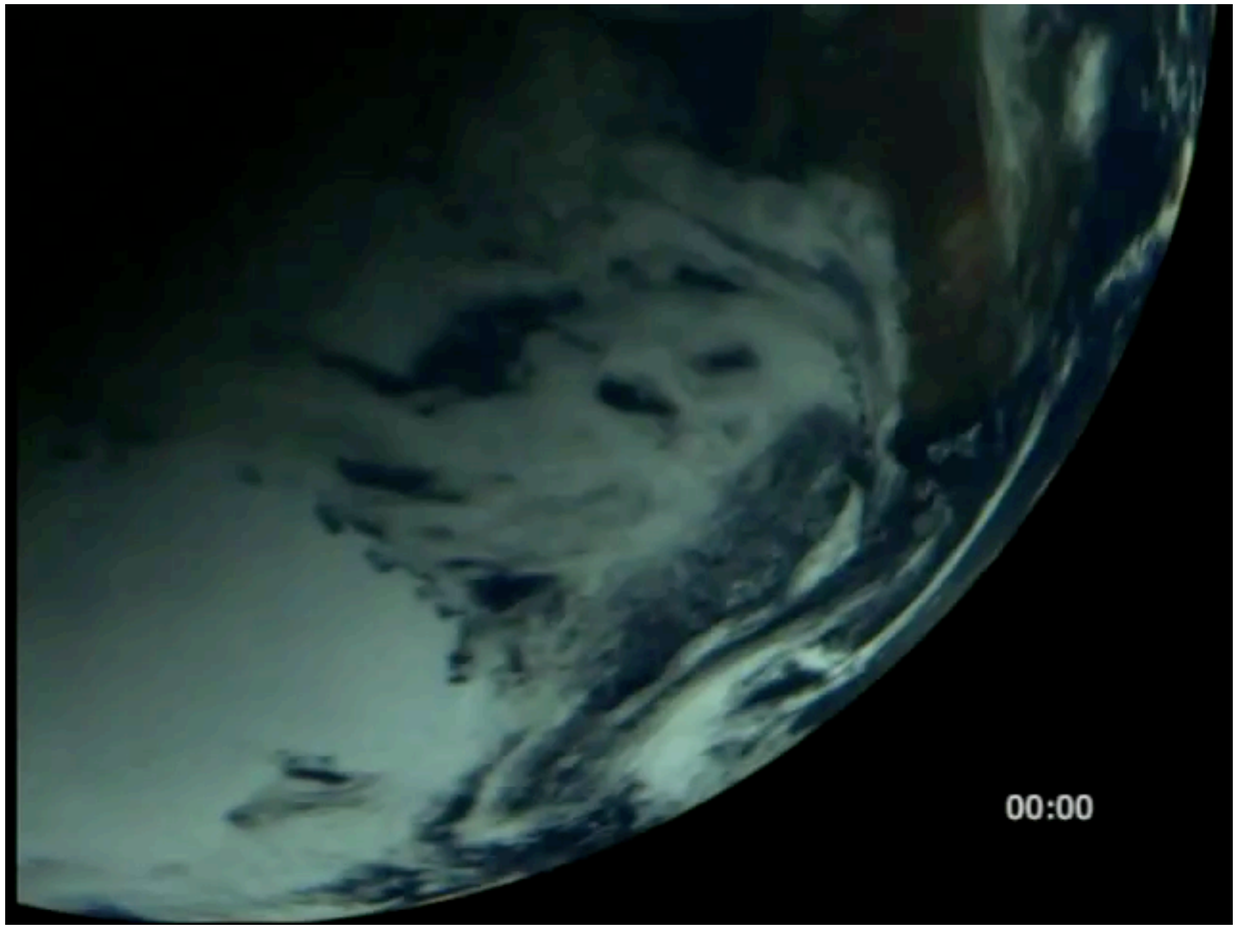
  > influence on moisture and the water cycle!



https://www.sciencephoto.com/media/693926/view/el-nino-winter-effects-illustration

Why does variability like this occur and why is climate so variable?

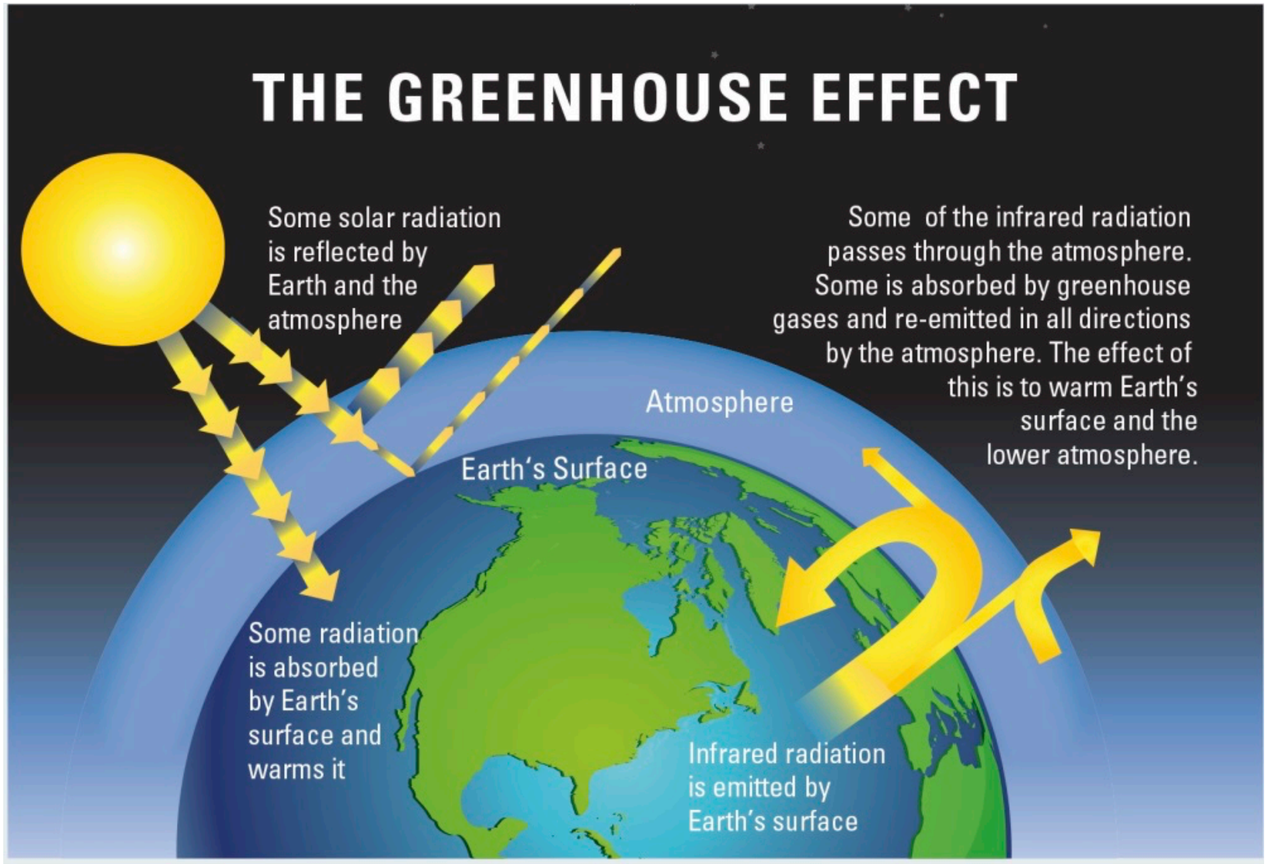
- The earth is a rotating sphere
- The sun heats up different parts of the earth up more during certain times of the day and year
- There are continents that are barriers for ocean water and for winds
- There is moisture in the air along with other gases that influence temperature and how air circulates in the atmosphere



https://svs.gsfc.nasa.gov/1371

How might climate change in the future?

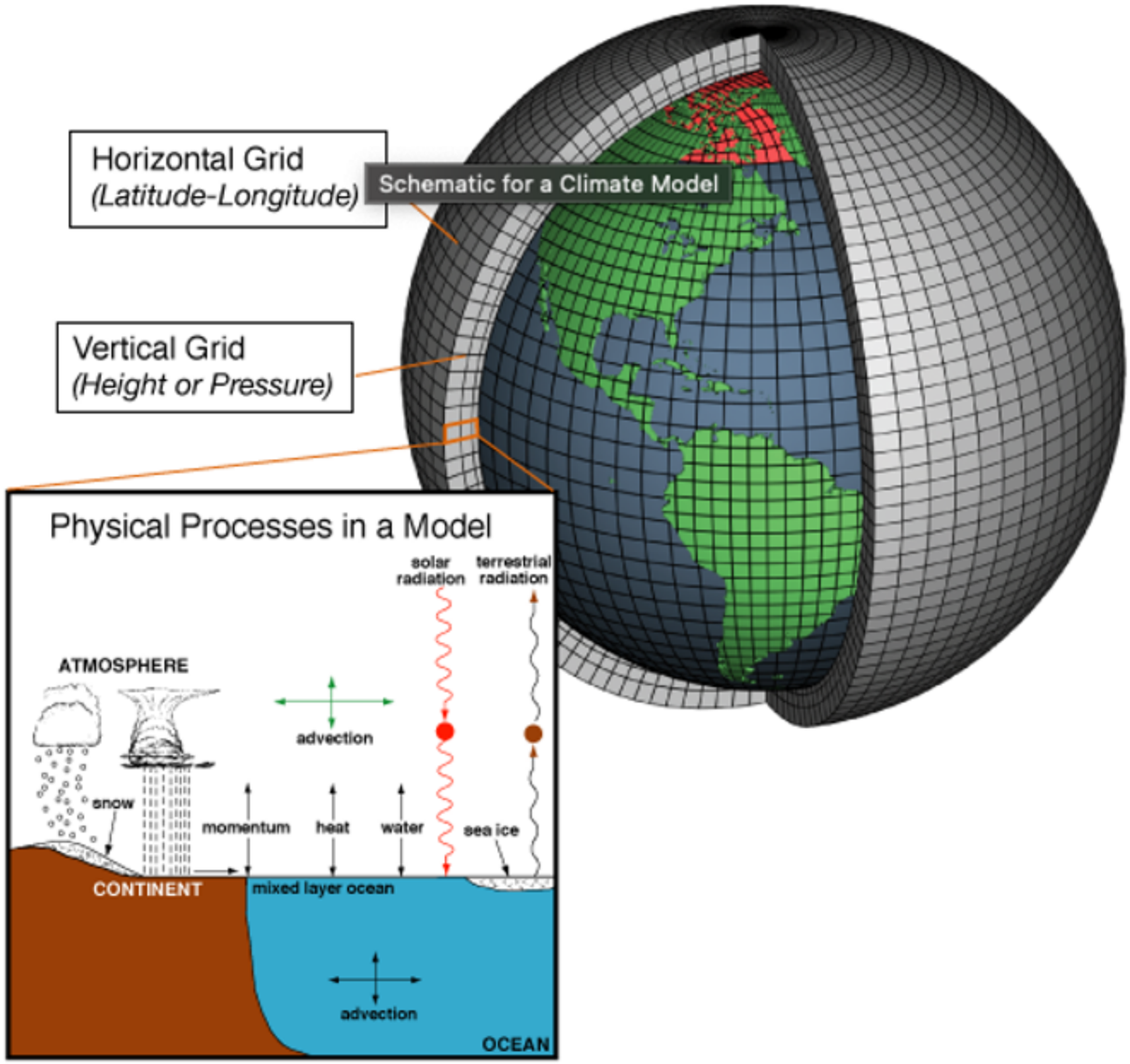
- Greenhouse gases are gases in the atmosphere that are able to absorb radiation
  - These gases can make the atmosphere warmer
- A warmer atmosphere can mean a warmer surface
- A warmer atmosphere also has the ability to hold more water (condensation is related to temperature)
- If the surface is warmer but the atmosphere is wetter what does this mean for climate variability?
- Will the effects of this be the same everywhere?



https://royalsociety.org/topics-policy/projects/climate-change-evidence-causes/basics-of-climate-change/

How do we manage variability and change in the water cycle?

- One part of understanding our climate and managing a changing climate is climate information
  - In our work we use observations and climate models
- Models are useful as we can do experiments with them – take a way all the water! take away all the continents! – and see what happens to the climate
- Models allow us to predict the future – to the end of the century – to the end of the season
- They allow us to try and figure out how different parts of the climate are connected and how they might change



https://www.climate.gov/file/atmosphericmodelschematicpng

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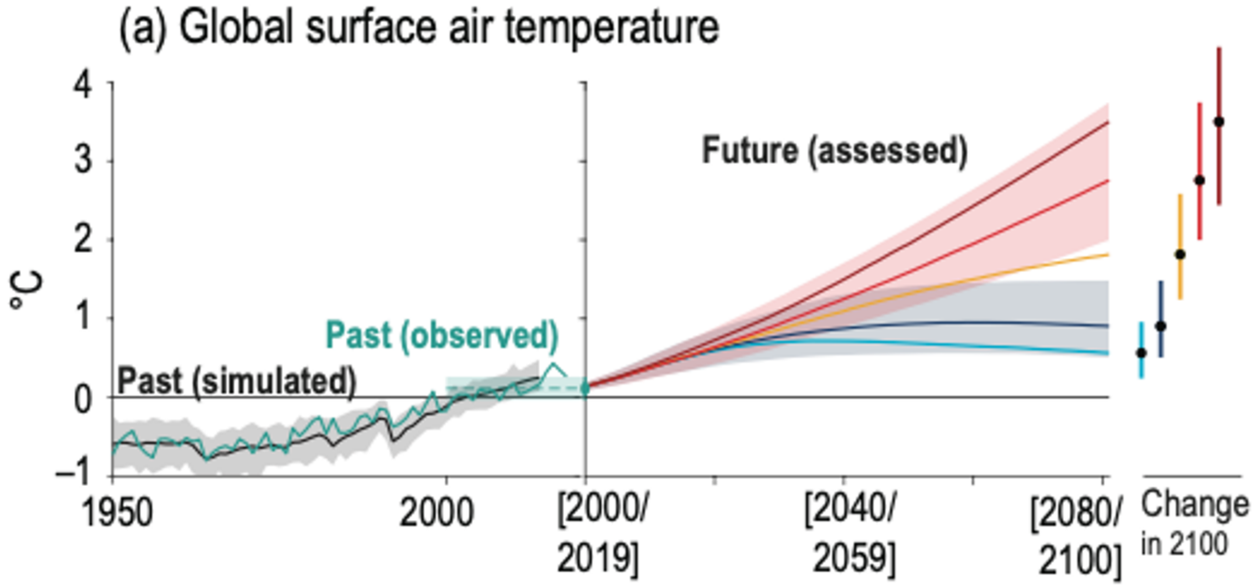

IPCC AR6 Working Group 1 – The Physical Science Basis (Fig TS.8)

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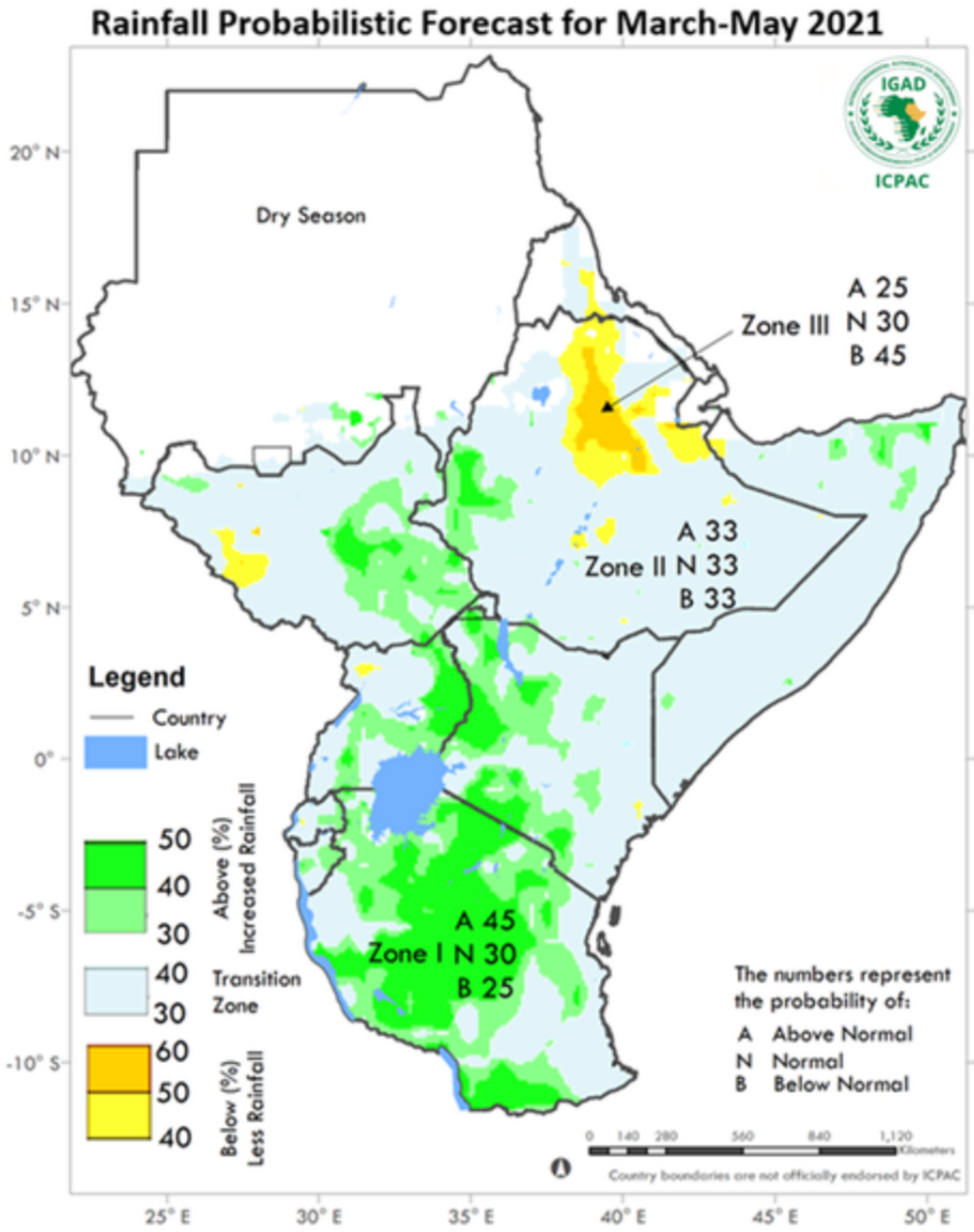

https://www.icpac.net/seasonal-forecast/

How do we make climate information useful and useable?

- A big challenge is to make information from models useful and available to people who need it – how do you get a forecast if you live in a remote area?
- Another challenge to is make it easy to use – can you understand the forecast map I showed earlier?
- Uncertainty in projections and forecasts makes using climate information hard – do users trust it enough to make decisions with?
- What climate information is useful in your life? How do you use it?