



ICFM Webinar No.11 Floods in Brazil

(C) IAHS



ICFM
Webinar
Series

How Do We Learn from Flood-Human Feedbacks Under Change?

Mario Mendiondo, Universidade de São Paulo - Brazil



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Wednesday, May 10th 2023

- 13:00 (UTC)
- 09:00 (Eastern Daylight Time)
- 10:00 (Brazil Standard Time)
- 15:00 (Central European Summer Time)
- 21:00 (China Standard Time)



<https://orcid.org/0000-0003-2319-2773>

<https://www.icfm.world/Webinars/webinars-no-11.html>

[#OneDropOfScience](#)
[#OneDoseOfResilience](#)
[#BeFAIRwithCARE](#)
[#GenerationRestoration](#)

Brazil, floods, learning, changes, floods again...



Brazil – Thousands Displaced After Floods and Landslides in Bahia, 27 APRIL, 2023



Brazil – Over 10,000 Displaced by Floods in Acre State, 29 March 2023



Brazil – 170 Families Homeless After More Floods in Manaus,

27 March 2023



Brazil – 680mm of Rain in 24 Hours Triggers Floods + Landslides in São Paulo, Dozens Killed
20 Feb., 2023

Floods in São Sebastião, Brazil, February 2023 – Daniela Andrade PMSS 1

The government of São Paulo state said that heavy rain began on 18 February. Below are some of the highest accumulations for a 24-hour period to 19 February:

- Bertioga 683 mm
- Guarujá 395 mm
- Santos 232 mm
- São Vicente 194 mm
- Cubatão 117 mm
- Praia Grande 209 mm
- Mongaguá 112 mm
- Itanhaém 94 mm
- Peruíbe 98 mm
- Ubatuba 335 mm
- Caraguatatuba 234 mm
- Ilhabela 337 mm
- São Sebastião 627 mm



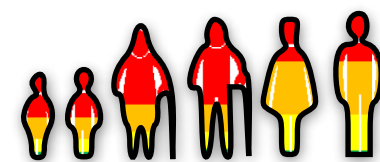
<https://floodlist.com/tag/brazil>



FloodList



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How can we learn from flood-human feedbacks under change?



Floods in São Sebastião, Brazil, February 2023. Photo: Daniela Andrade / PMSS

Flood protection?
 Flood recovery?
 Flood risk?
 Flood insurance ?
 Forecasting and Warning Systems?
 Community Resilience?

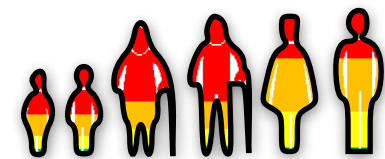


Floods in São Sebastião, Brazil, February 2023. Photo: Daniela Andrade / PMSS



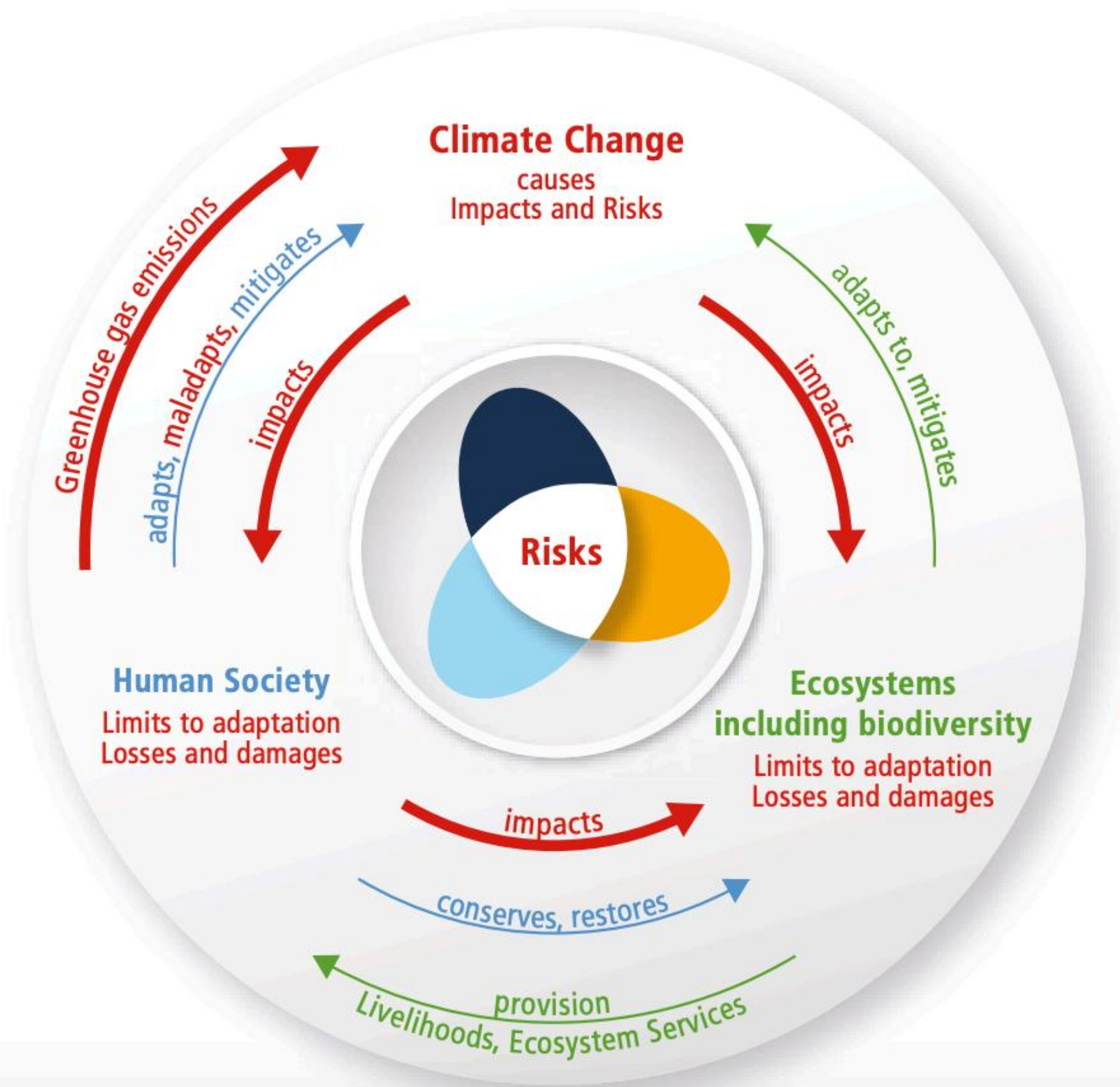
Floods in São Sebastião, Brazil, February 2023. Photo: Daniela Andrade / PMSS

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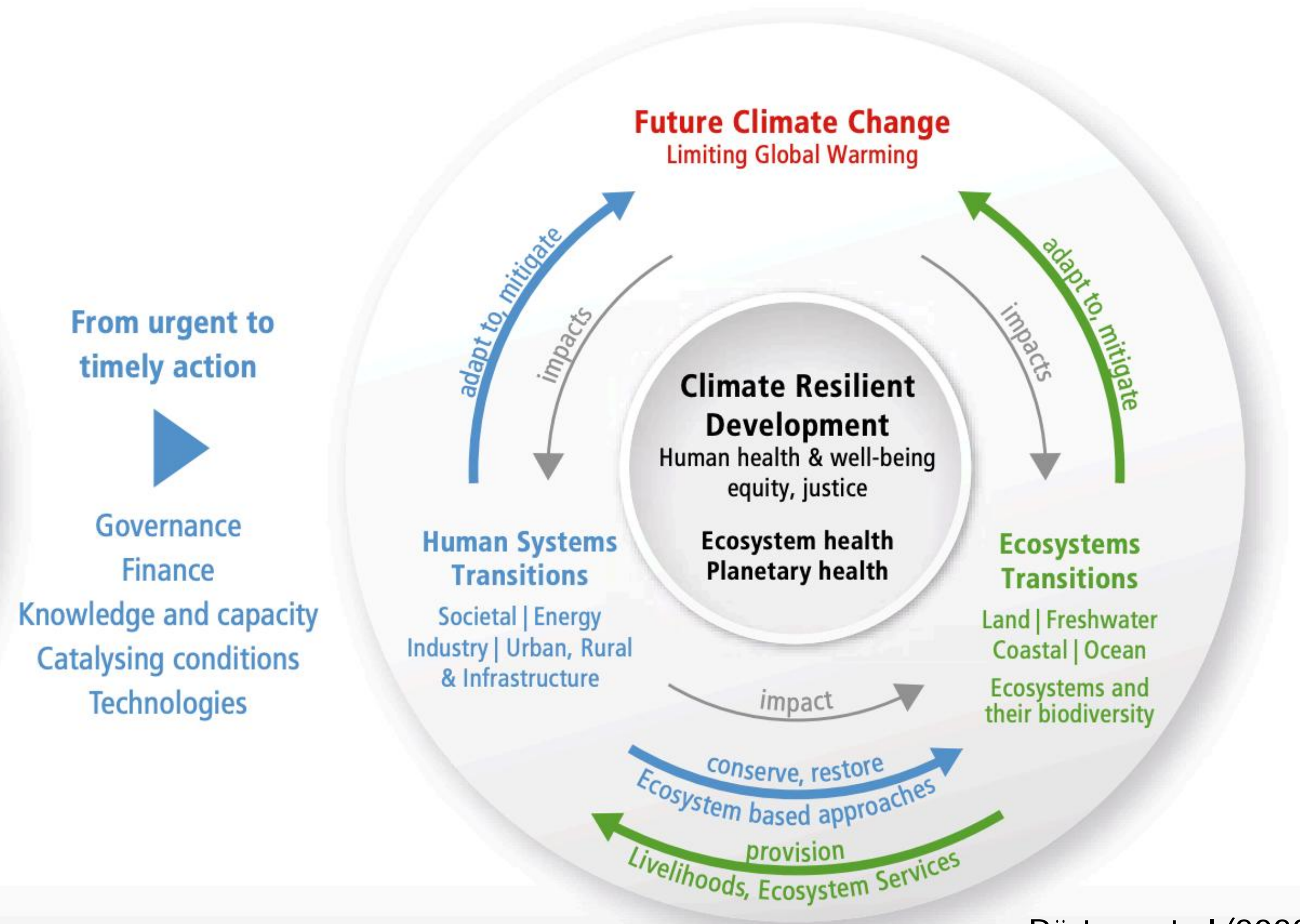


Flood-Human Feedbacks under a transition from RISK to RESILIENT DEVELOPMENT with COUPLED SYSTEMS (Climate, Ecosystems, Society, ...)

(a) Main interactions and trends



(b) Options to reduce climate risks and establish resilience

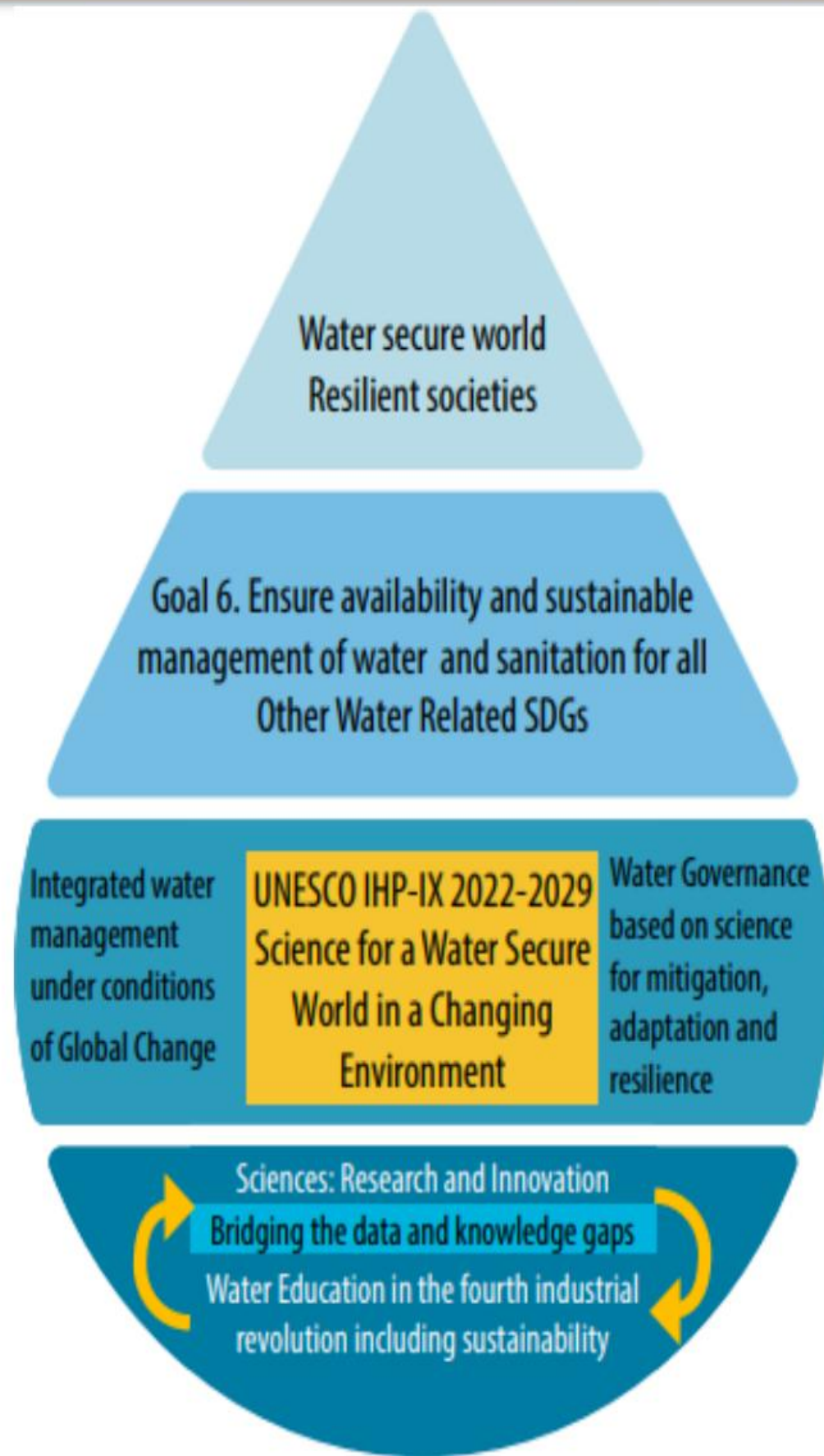


Pörtner et al (2022)

https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_TechnicalSummary.pdf

Flood-Human Feedbacks under the context of "Science for a Water Secure World in a Changing Environment"

Intergovernmental Hydrological Programme (9th Phase of IHP 2022-2029)



- 5 Priority Areas
 1. Scientific research and innovation
 2. Water Education in the Fourth Industrial Revolution including Sustainability
 3. Bridging the data-knowledge gap
 4. Integrated water resources management under conditions of global change
 5. Water Governance based on science for mitigation, adaptation and resilience
- 34 expected outputs
 - The Strategic Plan has been approved with its 5 priority areas and 34 expected outputs by the IHP Council in its 24th Session last June
- 150 Key activities
 - Operational Implementation Plan endorsed at the 25th Session of the IHP Council 26-29 April 2022

#BeFAIRwithCARE
 (Collective benefits, Authority to control, Responsibility & Ethics) ("CARE")



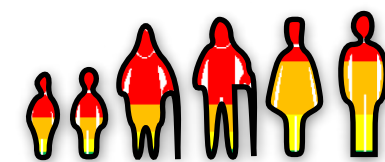
Justice, Equity, Diversity, Inclusion ("JEDI")

<http://climacom.mudancasclimaticas.net.br/eduardo-mario-mendiondo-2019-o-ano-liquido-que-nao-acabou/>

Mendiondo "2019, the year which has never ended..."

<https://unesdoc.unesco.org/ark:/48223/pf0000381318>

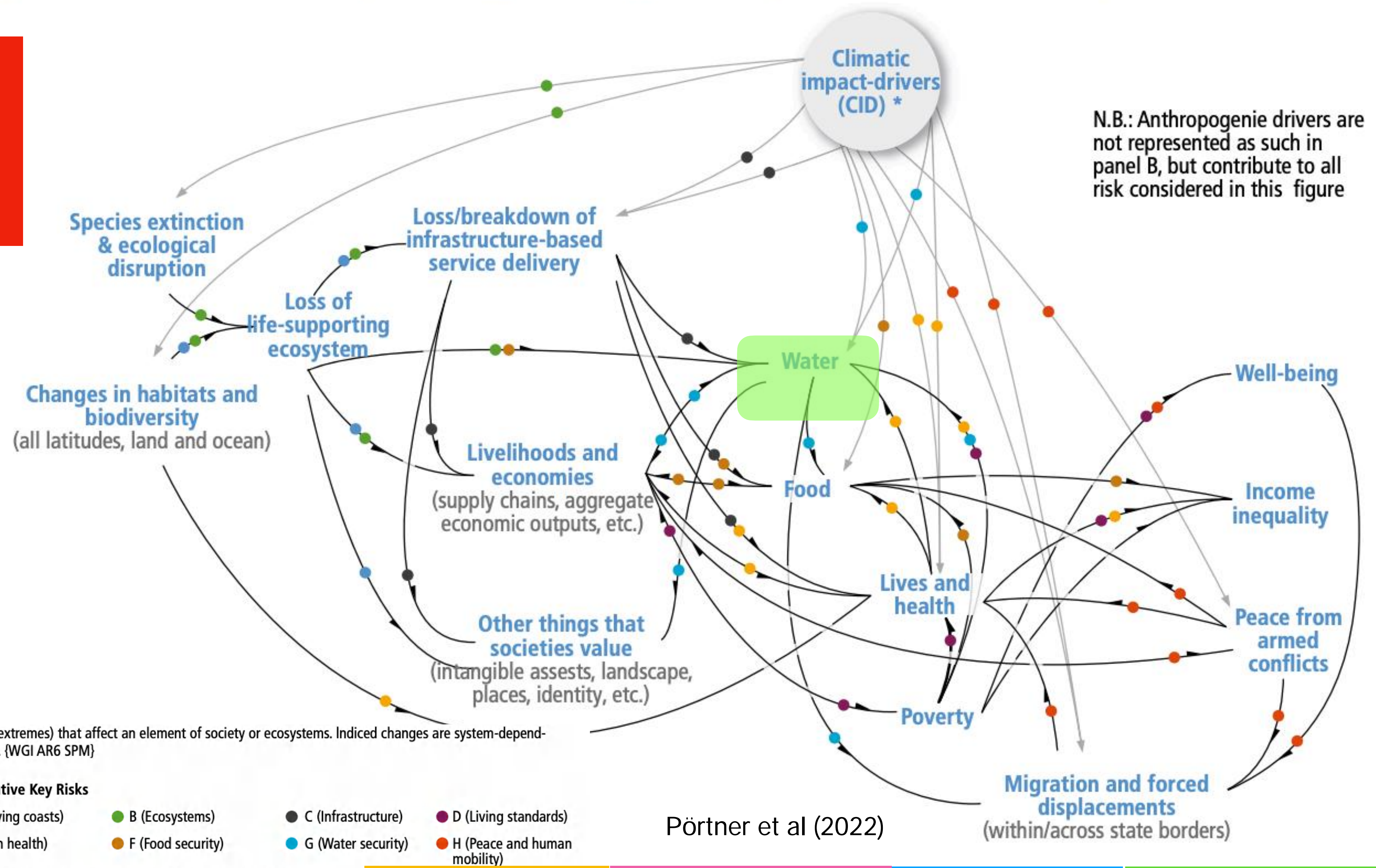
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(b) Illustration of interactions at the Key Risk level (e.g. from ecological risk to key dimensions for human societies)

key risks,
Human dimensions,
Ecosystems,
Circularity insights

https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_TechnicalSummary.pdf



N.B.: Anthropogenic drivers are not represented as such in panel B, but contribute to all risk considered in this figure

* CIDs are physical climate system conditions (e.g., means, events, extremes) that affect an element of society or ecosystems. Indiced changes are system-dependent and can be detrimental, beneficial, neutral, or a mixture of each. {WGI AR6 SPM}

Risk cascades **

- Across key risks
- Climate-driven

Representative Key Risks

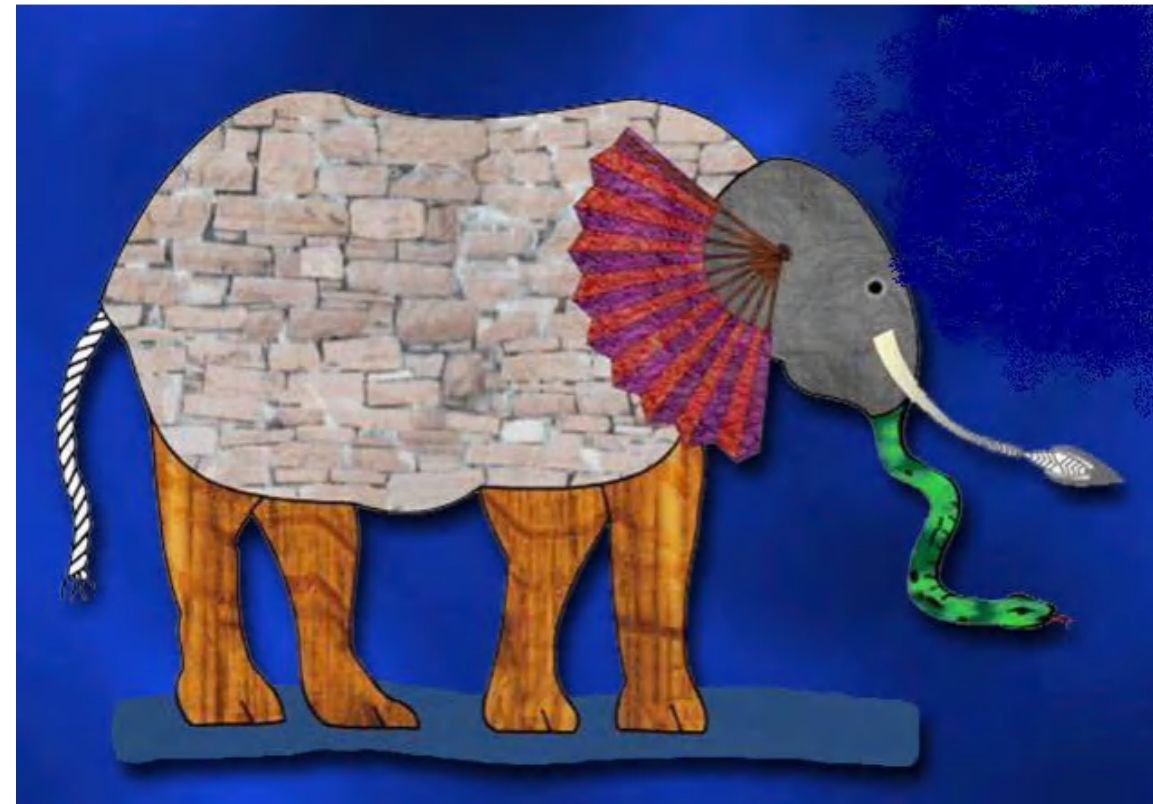
- A (Low-lying coasts)
- B (Ecosystems)
- C (Infrastructure)
- D (Living standards)
- E (Human health)
- F (Food security)
- G (Water security)
- H (Peace and human mobility)

Pörtner et al (2022)

** As illustrative suggested rather across than RKR comprehensive, assessments; and qualitative rather than quantitative

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Floods, learning, change, ACTIONS, HELPING !



PREDICTIONS

Predictions in
Ungauged Basins
(PUB)

2003-2012



CHANGE

Change in Hydrology
and Society
(Panta Rhei)

2013-2022



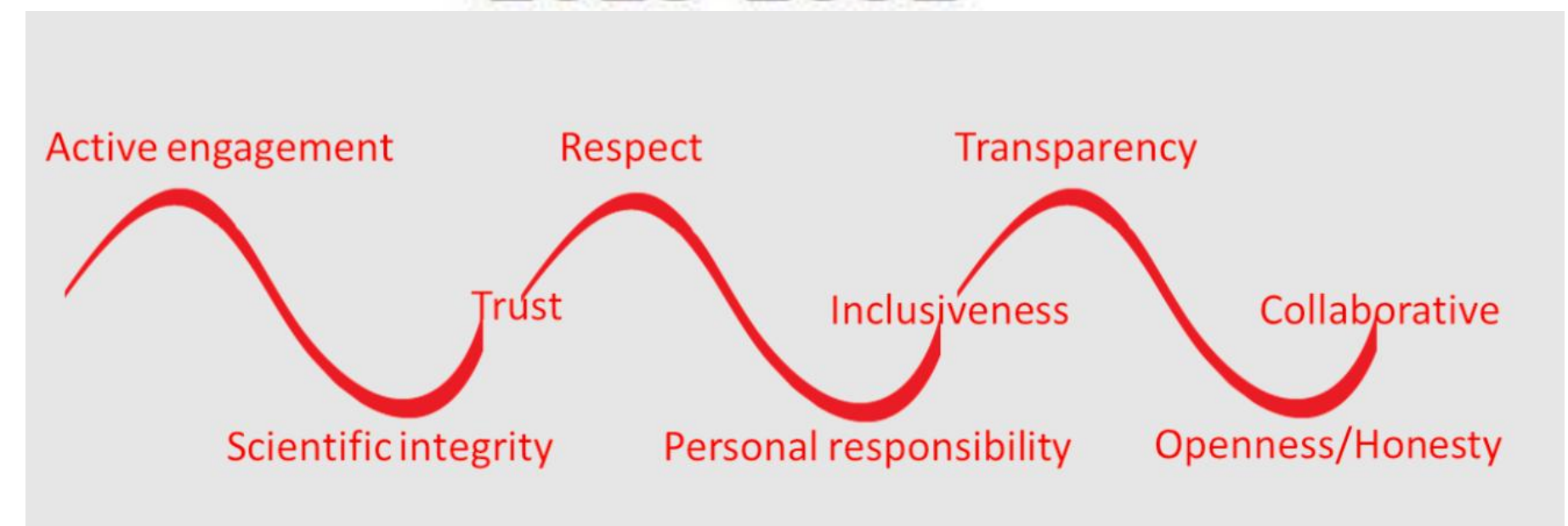
THE NEXT SCIENTIFIC
DECADE
Conversation Time



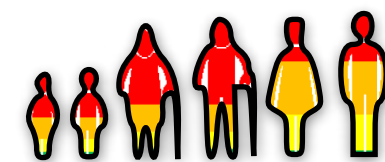
SOLUTIONS

Hydrology Engaging
Local People IN one
Global world
(HELPING)

2023-2032



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...and continues with partners and communication



Mendiondo "2019, o ano líquido que não acabou"

Synergism & dialogue between Brazilian National Institutes of Science & Technology & affiliated projects



<http://climacom.mudancasclimaticas.net.br/eduardo-mario-mendiondo-2019-o-ano-liquido-que-nao-acabou/>

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Flood-Human Feedbacks under Water Security Framework (multiple hazards of drought-flood-pollution...)

Community of Practice in the Context of Water security

Human dimension



Economic dimension

Ecosystem dimension

Resilience dimension

(C) Agencia Nacional de Águas - ANA

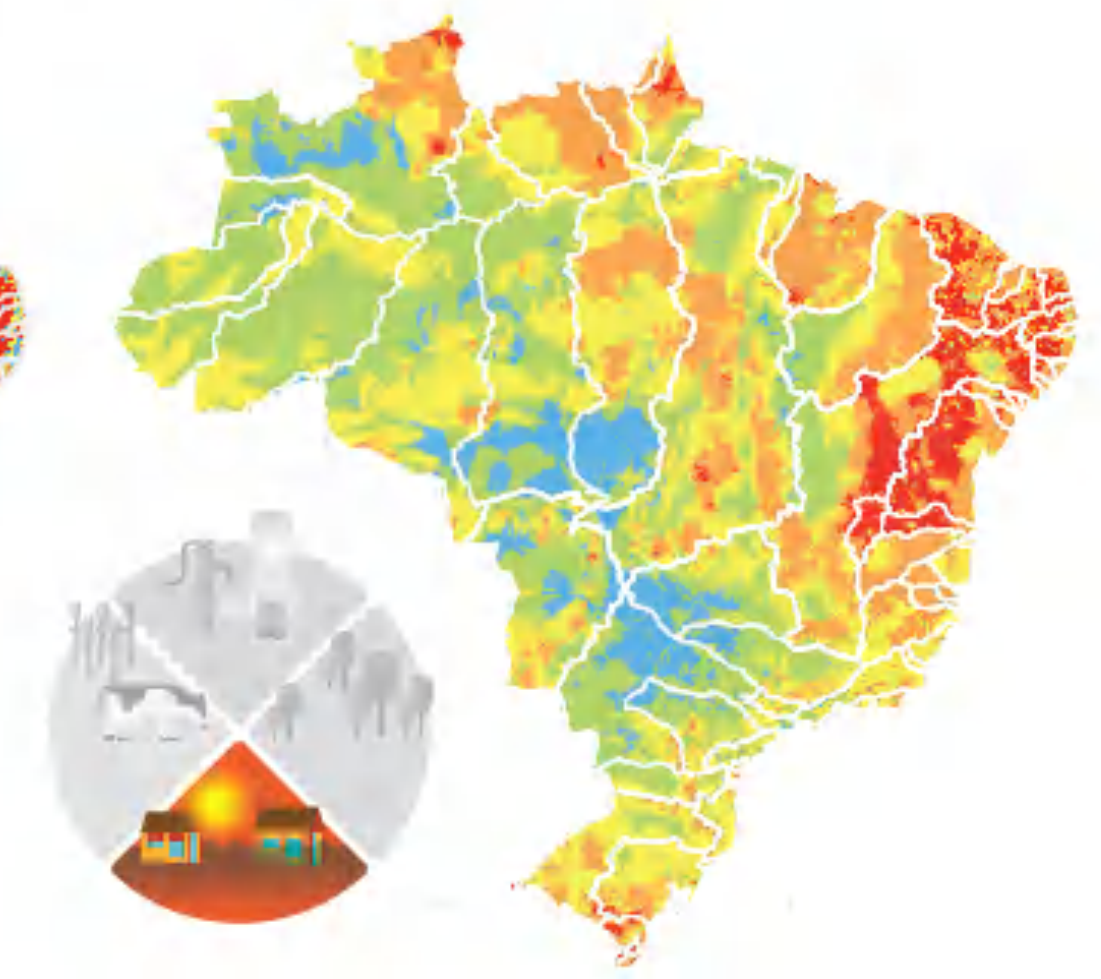
Dimensão Econômica

Dimensão Humana

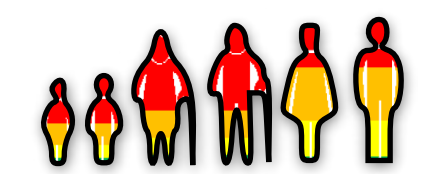


Dimensão Ecológica

Dimensão Resiliência



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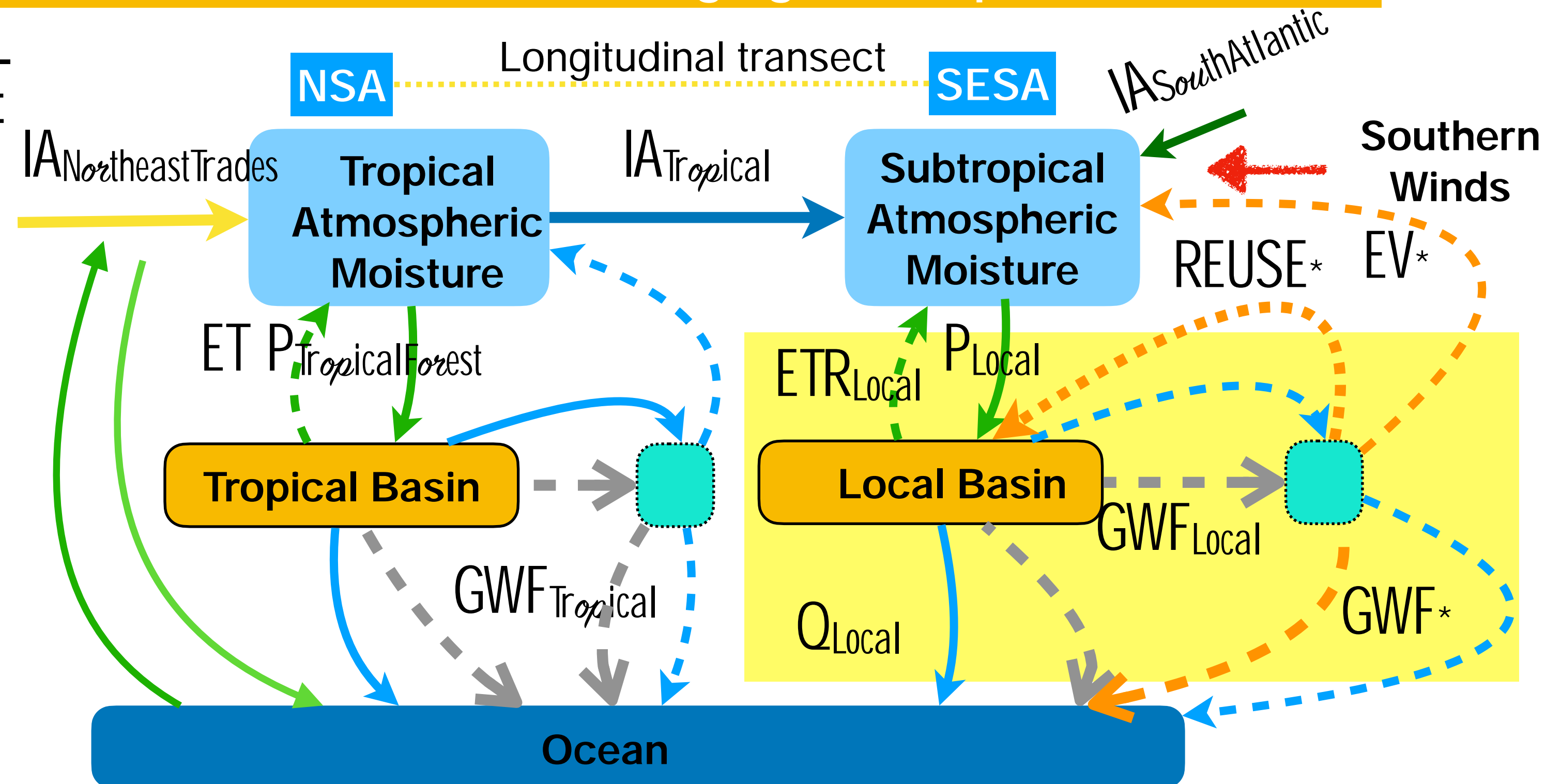
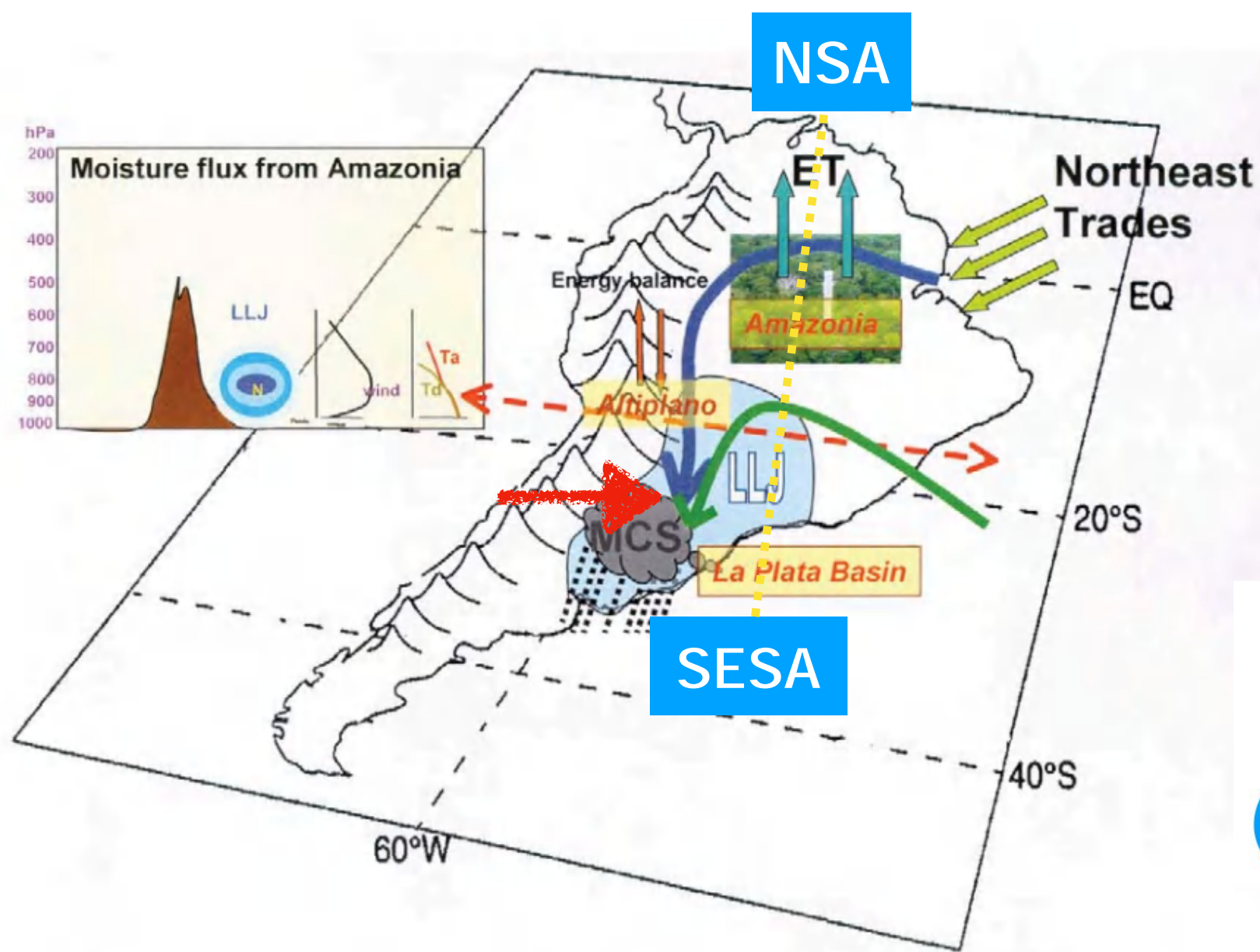


The C.A.S.H. Paradox COEVOLUTION OF AMAZON- SANITATION-HYGIENE

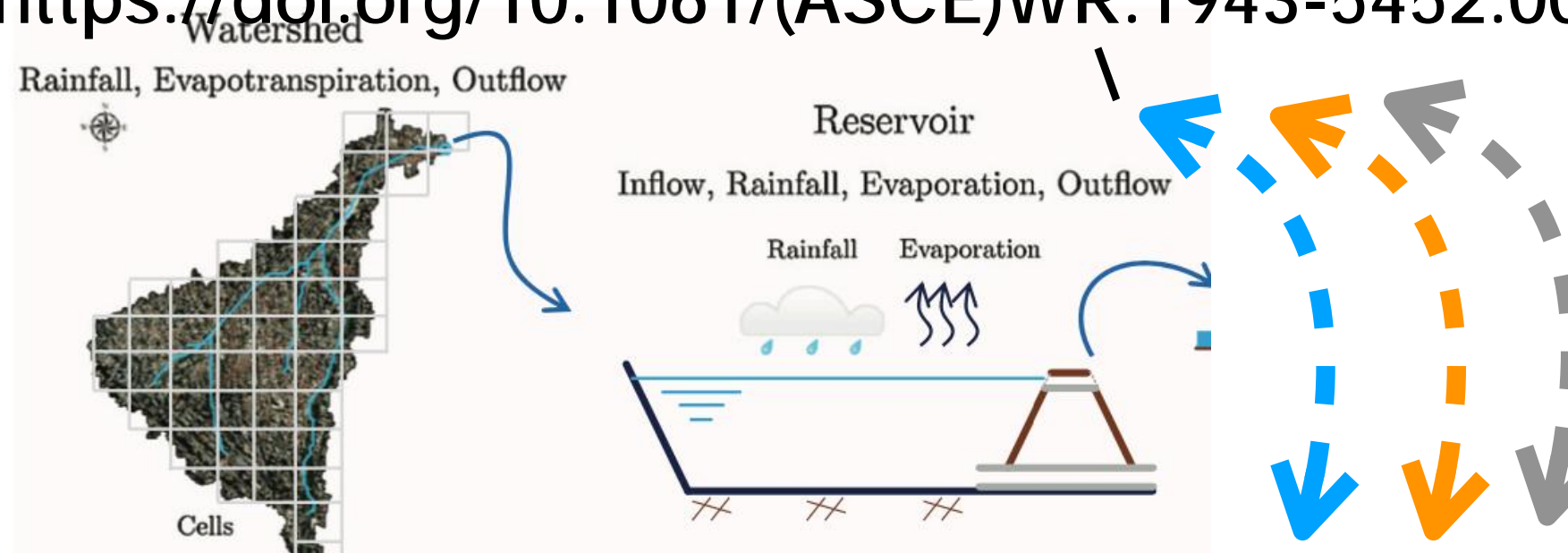
How can 1m² of Tropical Forest help mitigating Grey Water Footprint Risks in South American Megacities through Flood Pulses?

"BRONZE-2-GOLD": BRazilian Offsetting of Net-Zero Emissions toward GOals with Leveraging Development

FAPESP-
FACEPE
Project



[https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0001588](https://doi.org/10.1061/(ASCE)WR.1943-5452.0001588)



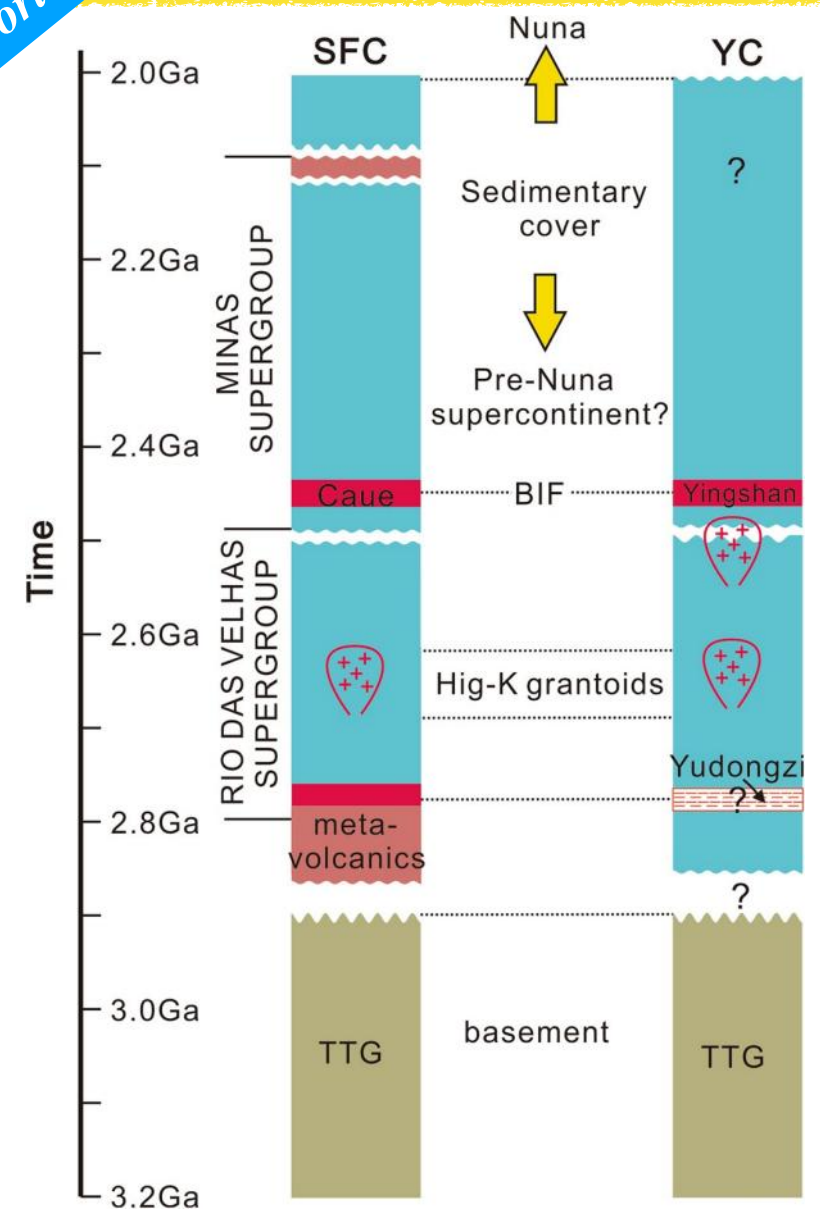
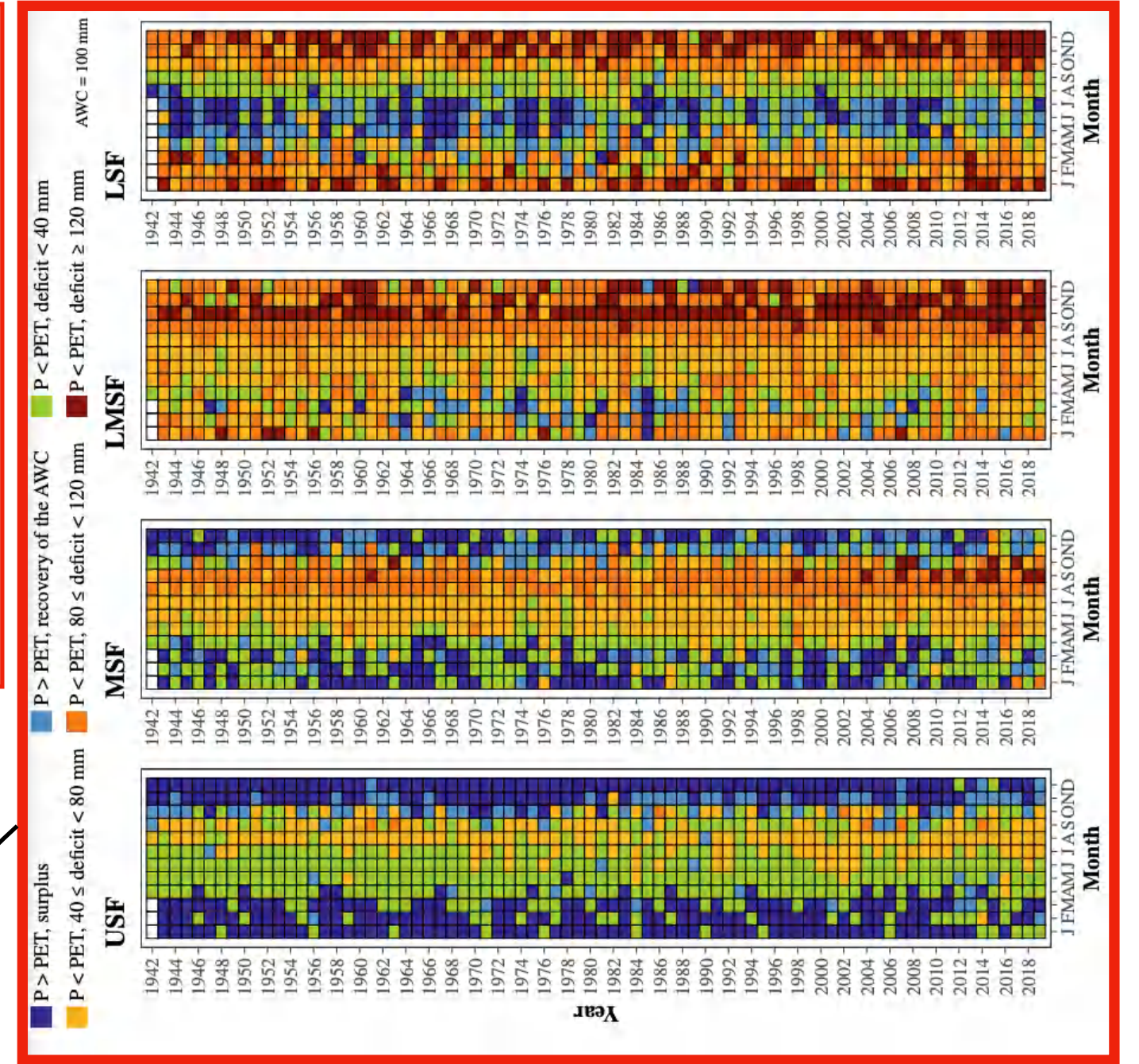
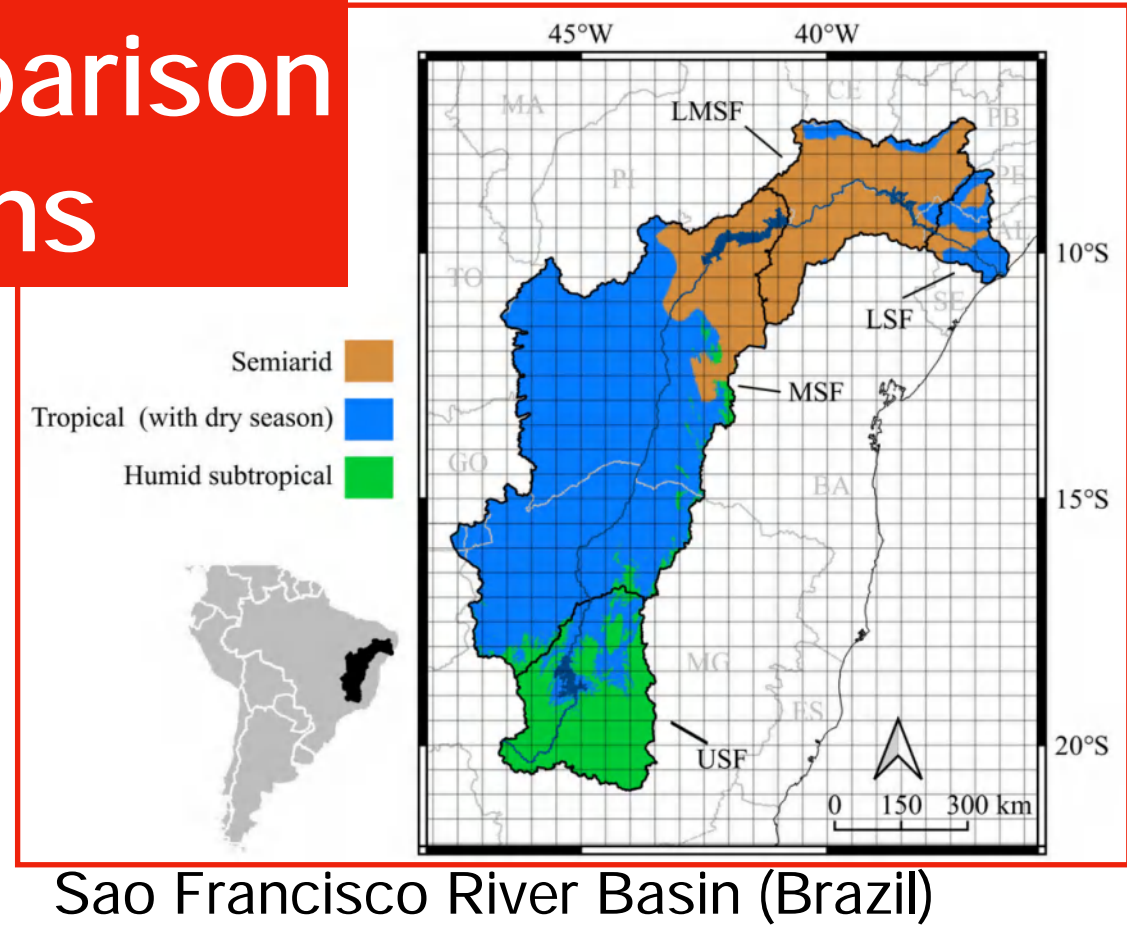
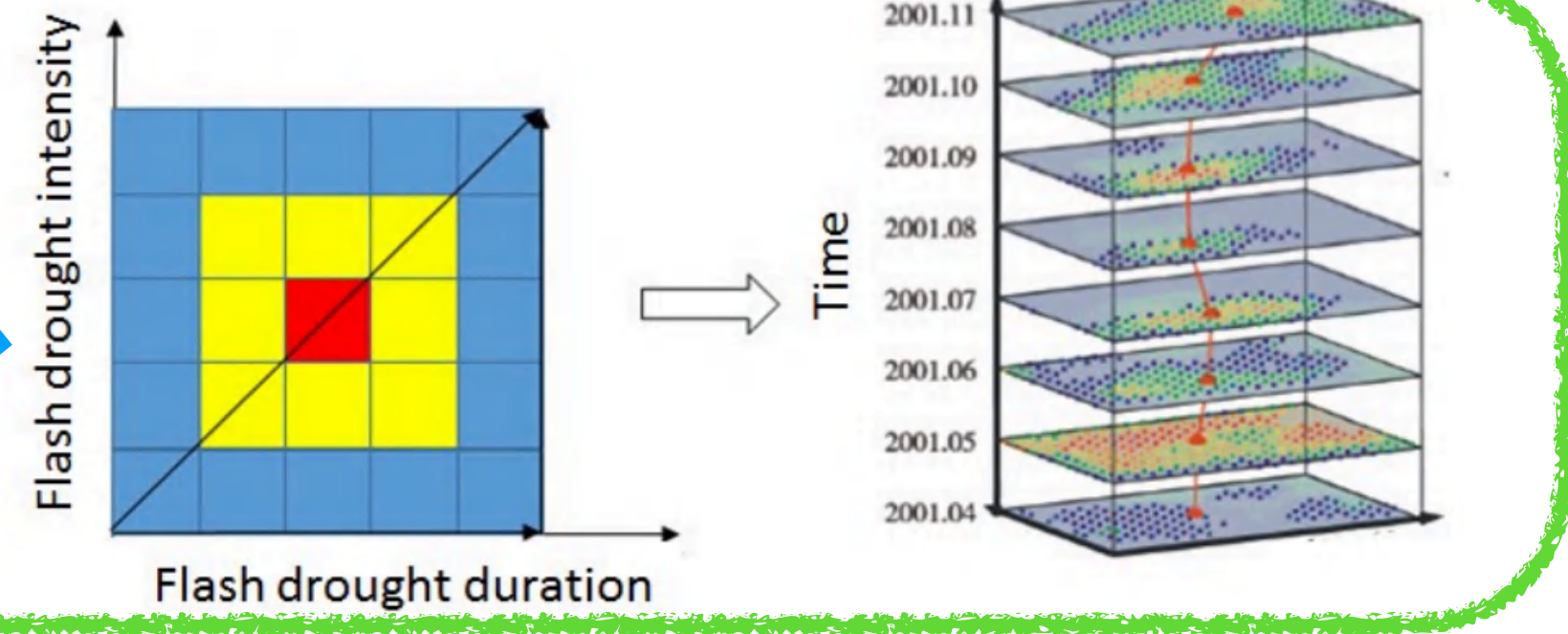
"ReWASH"
Recycling Water Assets
for Sustainable Habitats

FIG. 1. Schematic diagram of elements relevant to poleward moisture transport over South America. Blue and green arrows depict the moisture transport into the continent from the Amazon and South Atlantic Ocean, respectively. The inset represents a vertical cross-section of the LLJ core. The flow along the red dashed line displays the moisture transport along the LLJ core.

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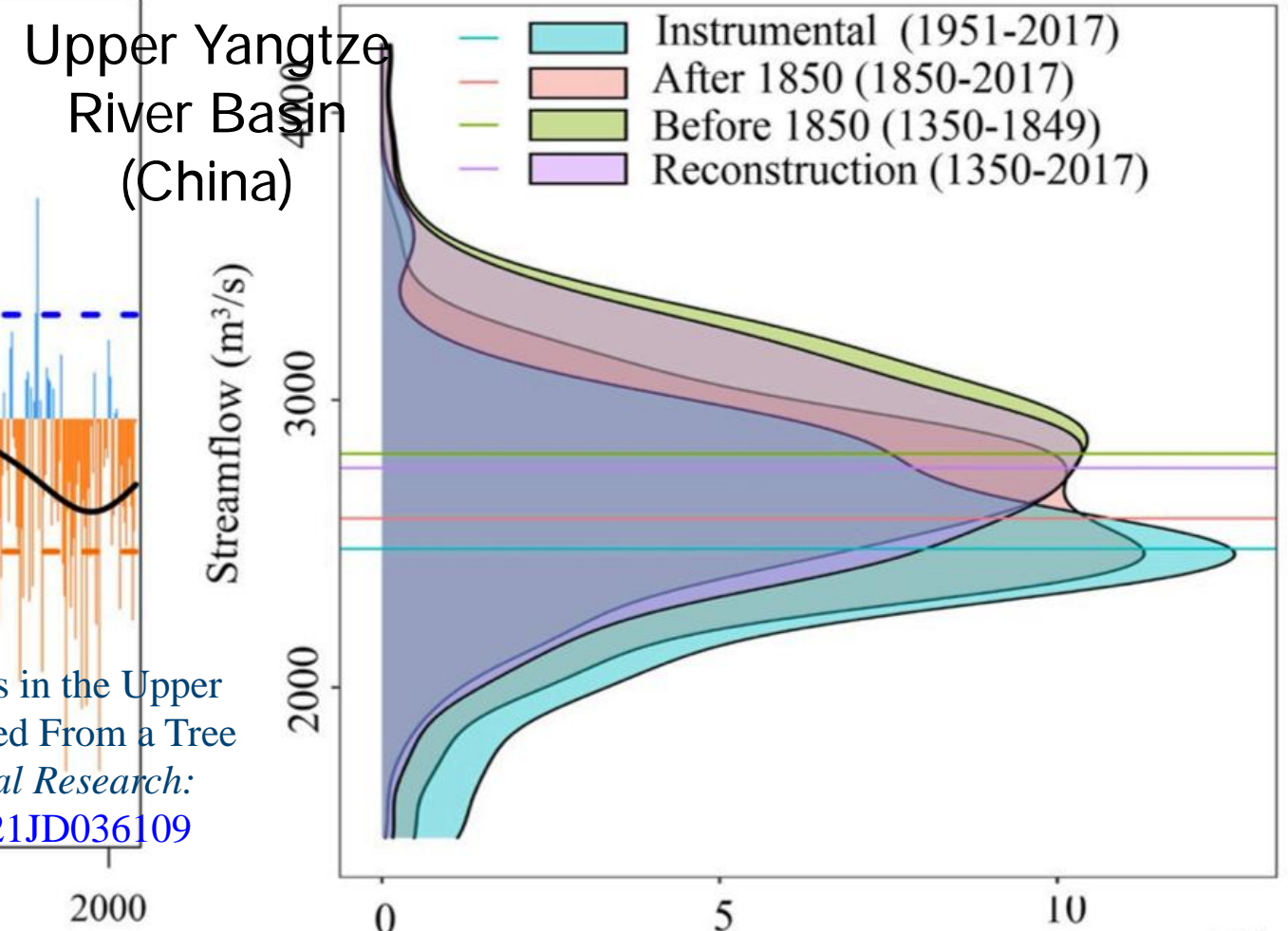
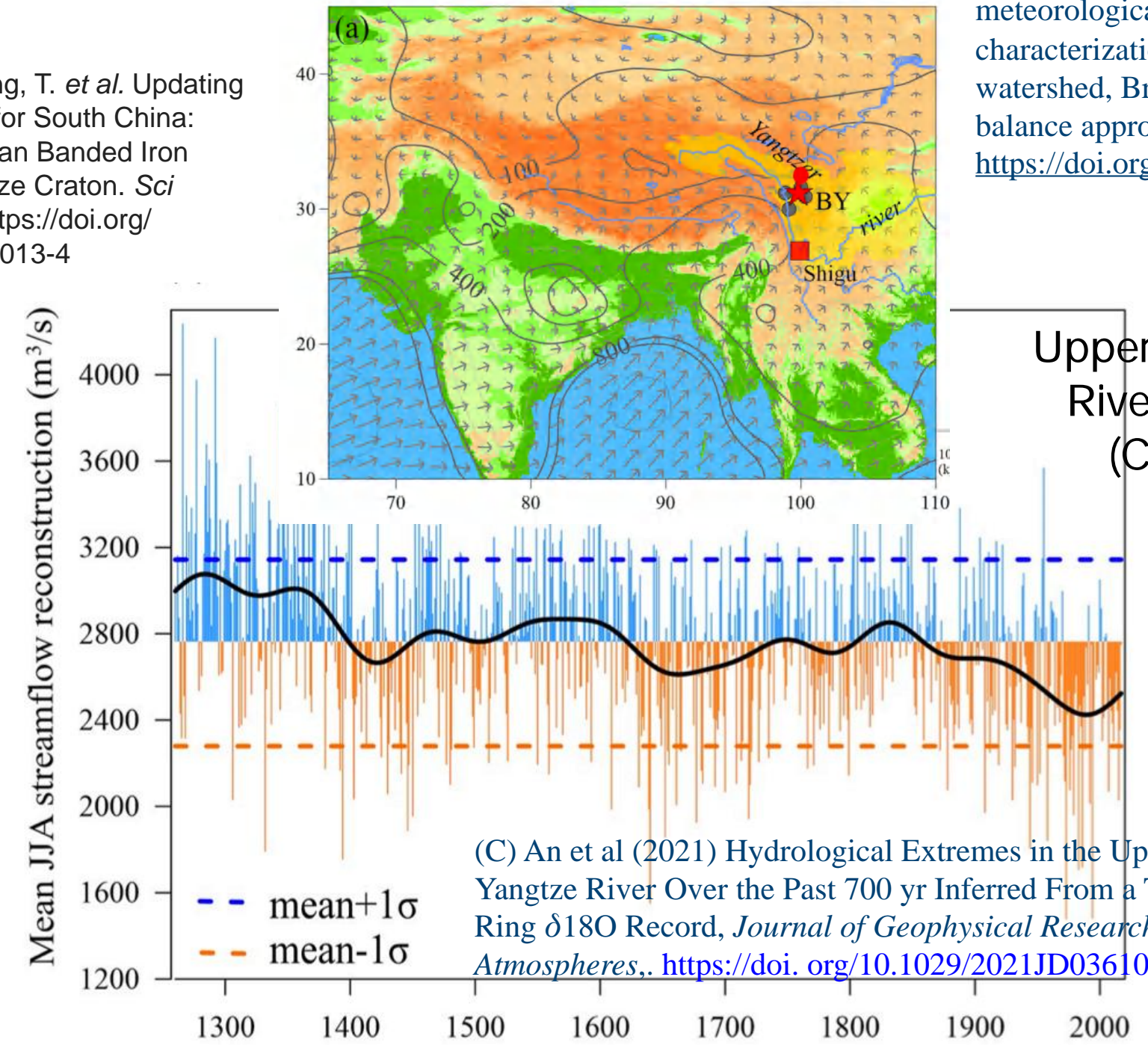
Brazil-China Project on Water Hazard Intercomparison for the Yangtze & Sao Francisco River Basins

Motivation
 Mendiondo (2023) Missão de Pesquisa
 FAPESP, Fortaleza-CE, 6/2/2023



(C) Ye, H., Wu, CZ., Yang, T. et al. Updating the Geologic Barcodes for South China: Discovery of Late Archean Banded Iron Formations in the Yangtze Craton. *Sci Rep* 7, 15082 (2017). <https://doi.org/10.1038/s41598-017-15013-4>

Comparison of stratigraphic-tectonic histories between the Southern Sao Francisco Craton (SF) and the Yangtze Craton (YC)



NFSC(China)-FAPESP Project #2022/08468-0
 Wuhan Univ. & EESC-USP
 Flash drought event evolution characteristics and the response mechanism to climate change considering the spatial correlation in the Yangtze & Sao Francisco river basins

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United Nations Educational, Scientific and Cultural Organization



- UNESCO Chair on Urban Water - Quality, Management, Recovery and Reuse
- University of São Paulo, Brazil

#GenerationRestoration

#Reimagine #Revive #Restore



www.ceped.eesc.usp.br



www.incline.iag.usp.br



www.cemaden.gov.br/inct-mudancas-climaticas



cemeai.icmc.usp.br



c4ai.inova.usp.br

谢谢 *obrigado* Спасибо

gracias Chaltu شكرا

yuum bo'otik *merci*

thank you aguyje

Añay!, sullpay!, pachi!



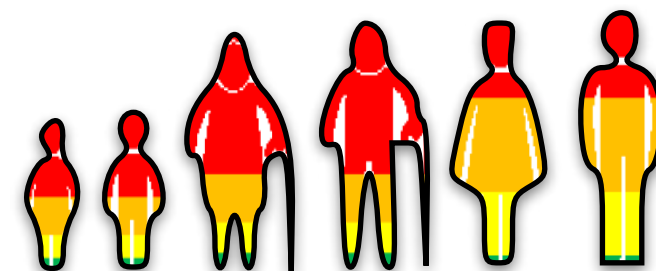
Waters for Our World!
#OnlyOneEarth
#OneDropOfScience
#OneDoseOfResilience
#ScienceForPeace



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