

COLLOQUE DE LA SOCIÉTÉ HYDROTECHNIQUE DE FRANCE

28 Novembre 2023

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Toulouse

Évolutions du régime pluviométrique au Sahel Ouest-Africain : détection,
éléments d'attribution et projections

Guillaume Chagnaud

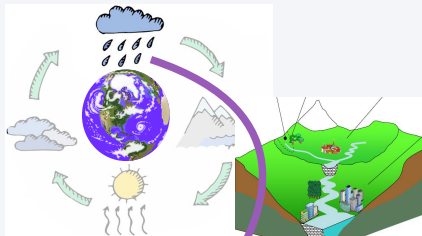
< guicha@ceh.ac.uk >



**UK Centre for
Ecology & Hydrology**

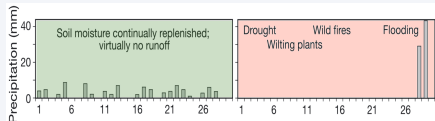
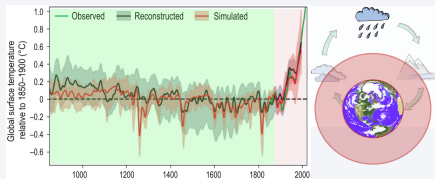
Contexte général et enjeu

Pluie → ressource et aléas



✓ climat stationnaire

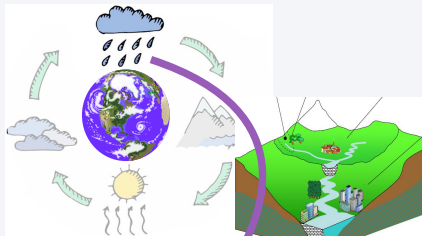
Réchauffement global et intensification hydro-climatique



✗ climat stationnaire

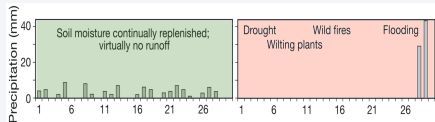
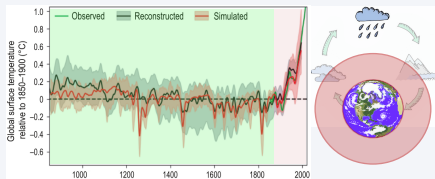
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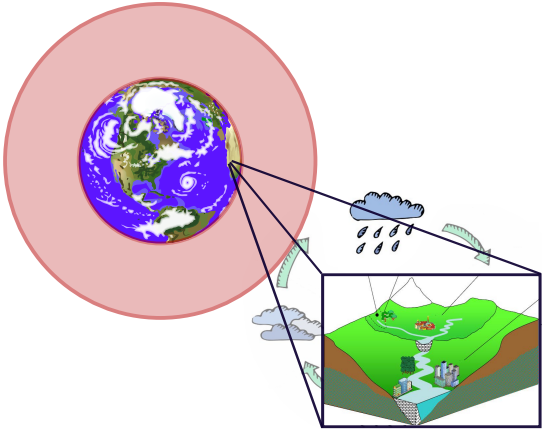
Réchauffement global et intensification hydro-climatique



X climat stationnaire

⇒ **Besoin d'informer l'adaptation au changement climatique**

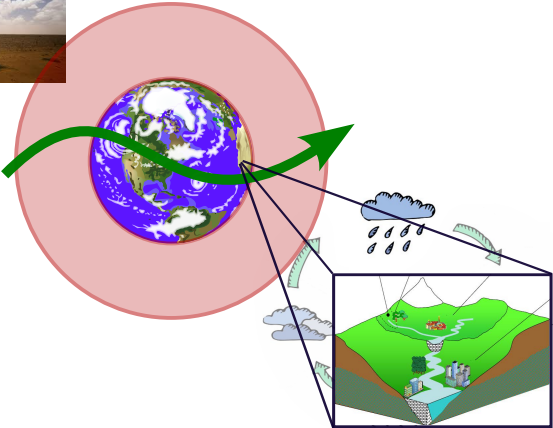
Objectif : documenter les évolutions pluviométriques au Sahel Ouest-Africain



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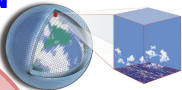


DETECTION

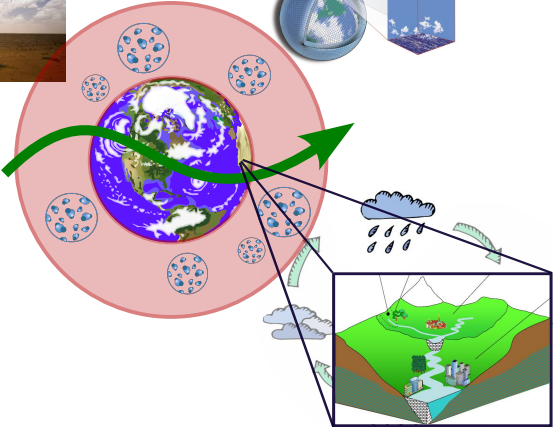


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ATTRIBUTION

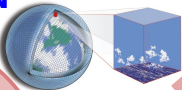


DETECTION



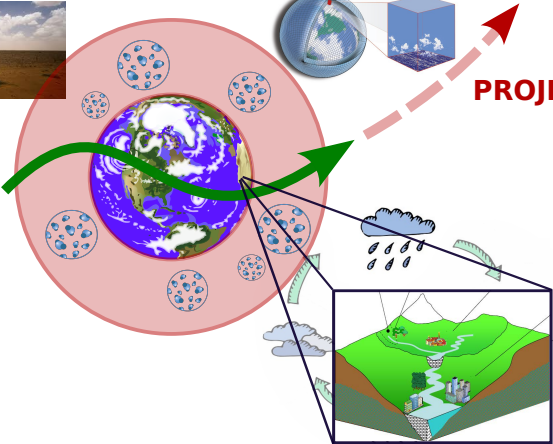
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ATTRIBUTION



PROJECTION

DETECTION

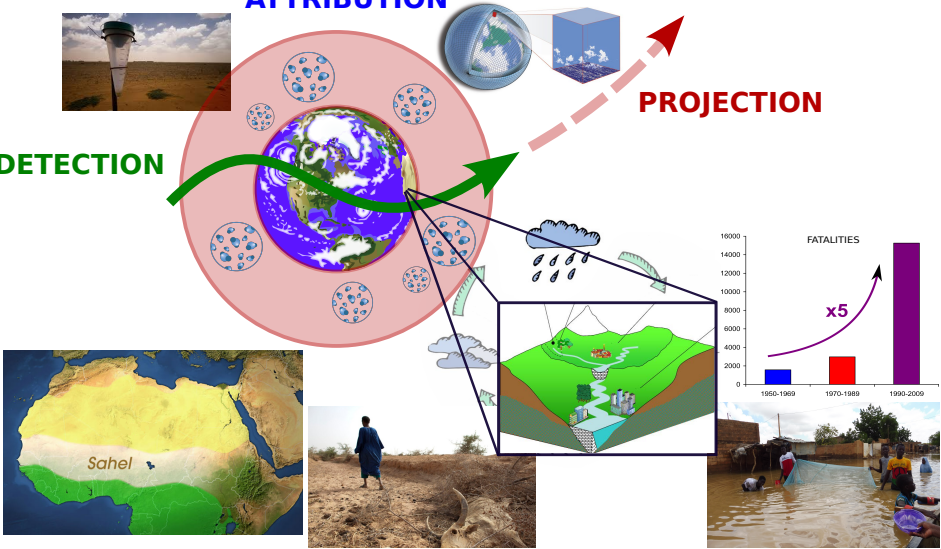


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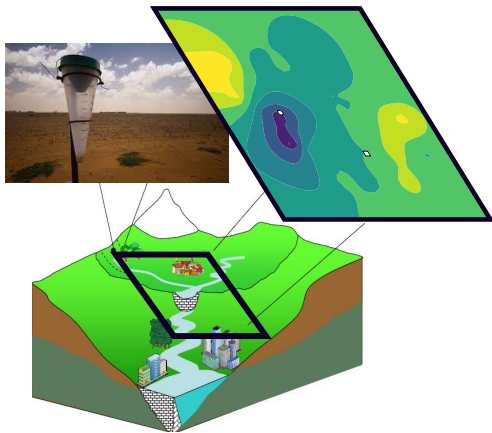
ATTRIBUTION

DETECTION

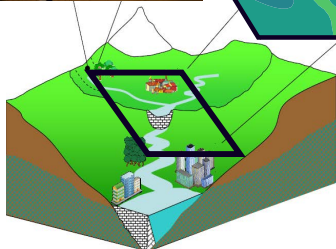
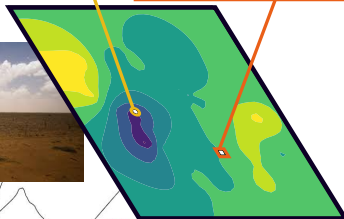
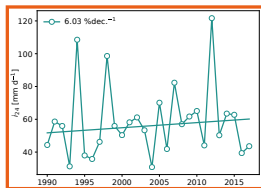
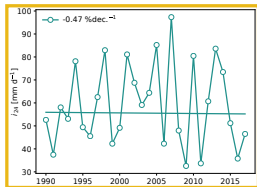
PROJECTION



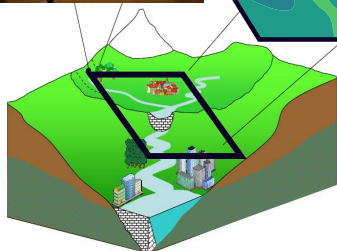
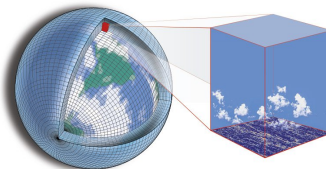
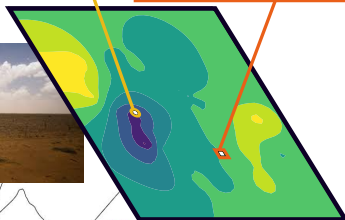
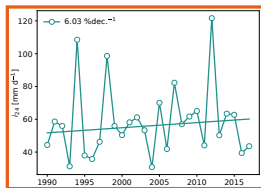
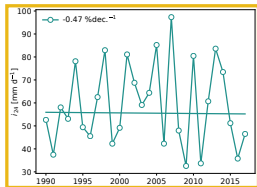
Problématique : extraire de l'information des jeux de données (obs, modèles)



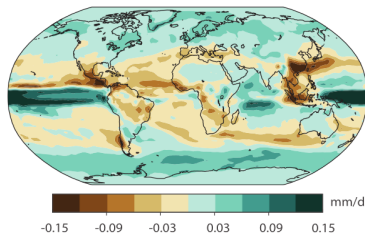
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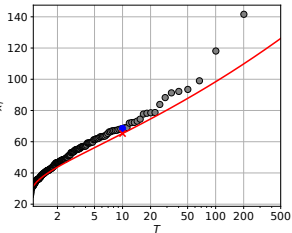
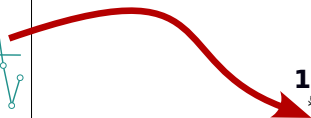
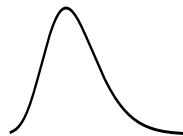
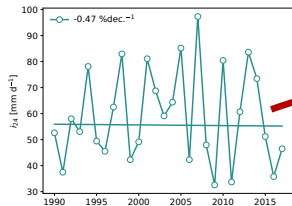
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GHG

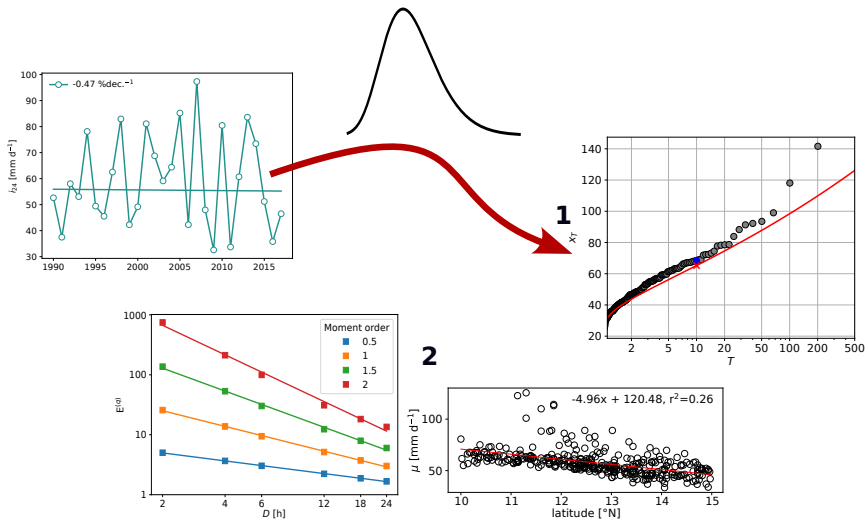


Outil : modélisation statistique



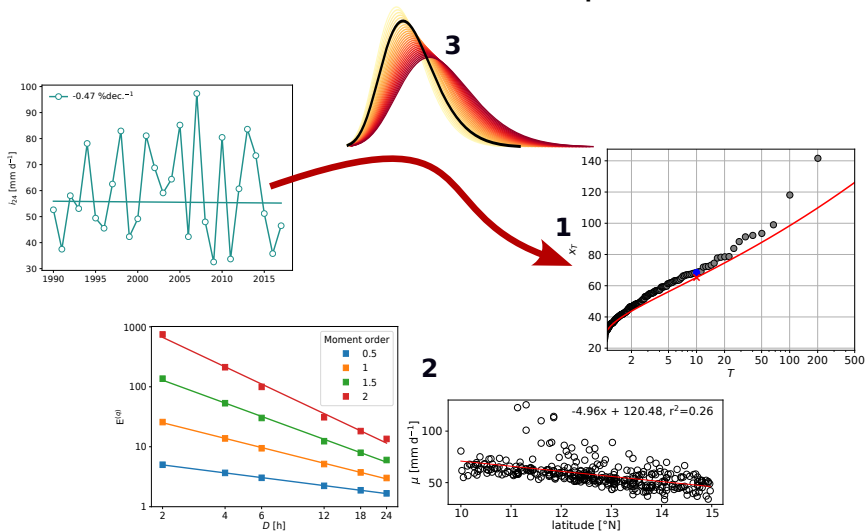
1. Extraire des valeurs dimensionnantes (niveaux/périodes de retour)

Outil : modélisation statistique



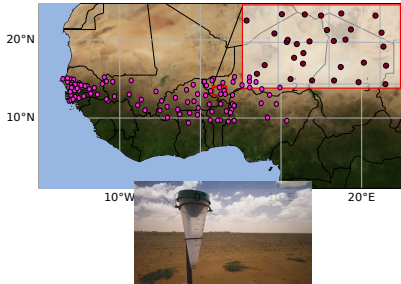
1. Extraire des valeurs dimensionnantes (niveaux/périodes de retour)
2. Rassembler l'information de façon cohérente (durées/espace)

Outil : modélisation statistique

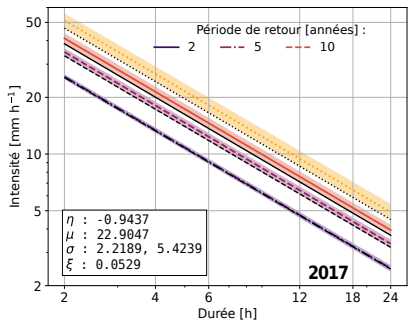
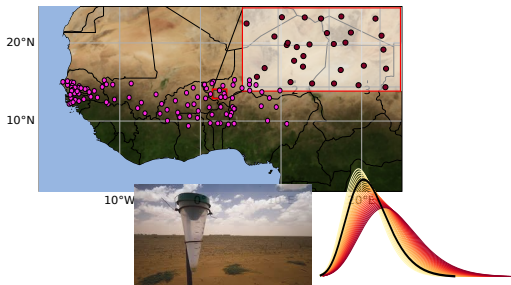


1. Extraire des valeurs dimensionnantes (niveaux/périodes de retour)
2. Rassembler l'information de façon cohérente (durées/espace)
3. Tester la non-stationnarité

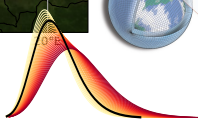
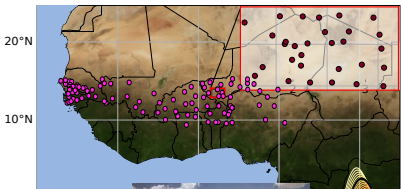
Résultats



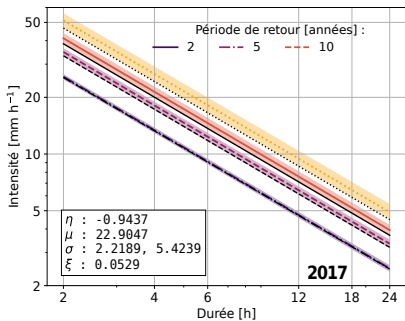
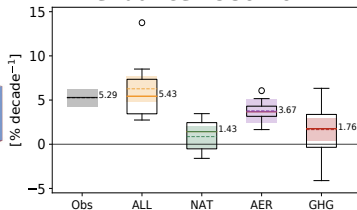
Résultats



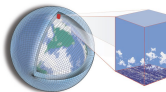
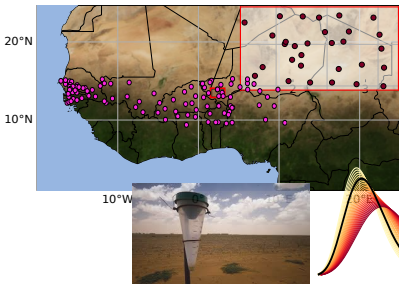
Résultats



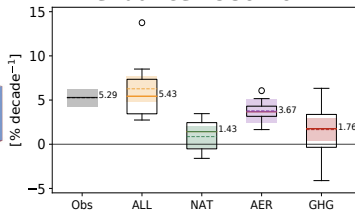
Pluie jour. 10-ans Tendance 1980-2014



Résultats

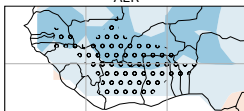


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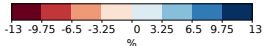
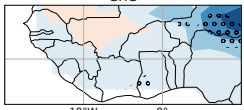


Δ intensité

AER

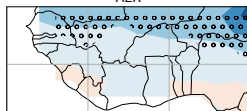


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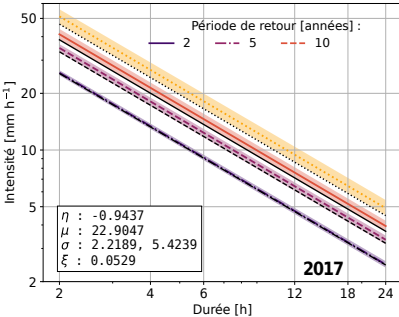
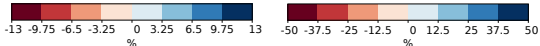
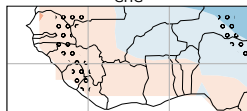


Δ occurrence

AER



GHG



Pour plus de détails :

- G. Chagnaud, G. Panthou, T. Vischel, J. Blanchet, and T. Lebel. A unified statistical framework for detecting trends in multi-timescale precipitation extremes: application to non-stationary intensity-duration-frequency curves. Theoretical and Applied Climatology, 145(1-2):839–860, July 2021. ISSN 0177-798X, 1434-4483. doi: 10.1007/s00704-021-03650-9. URL <https://link.springer.com/10.1007/s00704-021-03650-9>.
- G. Chagnaud, G. Panthou, T. Vischel, and T. Lebel. A synthetic view of rainfall intensification in the West African Sahel. Environmental Research Letters, 17(4):044005, Apr 2022. ISSN 1748-9326. doi: 10.1088/1748-9326/ac4a9c. URL <https://iopscience.iop.org/article/10.1088/1748-9326/ac4a9c>.
- G. Chagnaud, G. Panthou, T. Vischel, and T. Lebel. Capturing and Attributing the Rainfall Regime Intensification in the West African Sahel with CMIP6 Models. Journal of Climate, 36(6):1823–1843, Mar. 2023. ISSN 0894-8755, 1520-0442. doi: 10.1175/JCLI-D-22-0412.1. URL <https://journals.ametsoc.org/view/journals/clim/36/6/JCLI-D-22-0412.1.xml>.
- <https://theses.hal.science/tel-04125608v1>