

**WWD  
2023  
WEBINARS**

# MDPI World Water Day Webinar 2023: Accelerating Change

22 March 2023, 2:00 am – 4:00 am CET, 9:00 am – 11:30 am CET

## Do hydrological data support the climate crisis doctrine?



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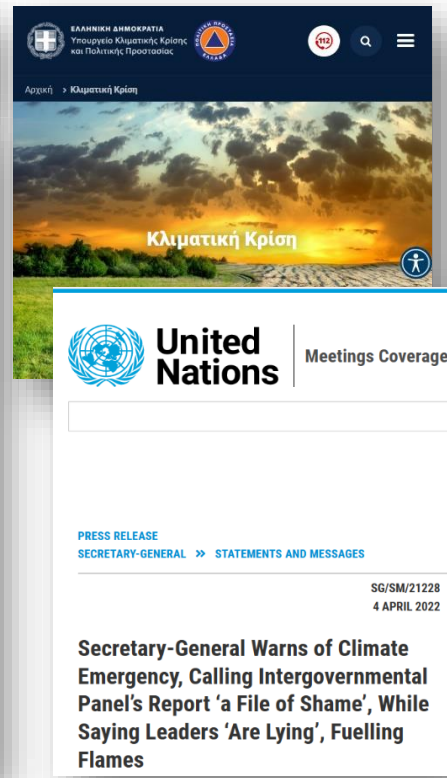
Available online: <http://www.itia.ntua.gr/2278/>

# Climate crisis is not a scientific issue; it's a political doctrine



The screenshot shows the European Parliament's news page. The main headline is "The European Parliament declares climate emergency". Below the headline, there are bullet points: "Commission must ensure all proposals are aligned with 1.5 °C target", "EU should cut emissions by 55% by 2030 to become climate neutral by 2050", and "Calls to reduce global emissions from shipping and aviation". There is also a photograph of a dirt road leading to a tree on a grassy field.

<https://www.europarl.europa.eu/news/en/press-room/20191121IPR67110/>



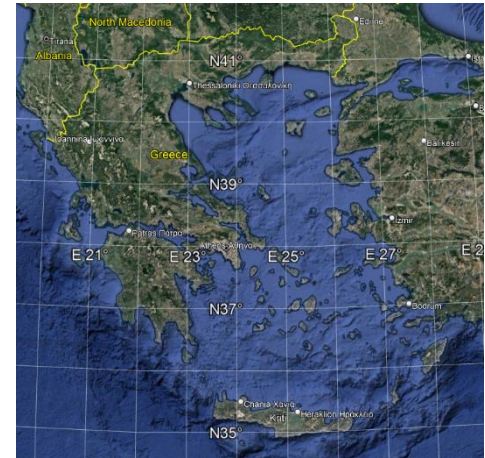
The top part of the screenshot shows the Greek Ministry of Climate Crisis and Environmental Protection website with the title "Κλιματική Κρίση". The bottom part shows a United Nations press release titled "Secretary-General Warns of Climate Emergency, Calling Intergovernmental Panel's Report 'a File of Shame', While Saying Leaders 'Are Lying', Fuelling Flames".

<https://civilprotection.gov.gr/klimatiki-krisi>

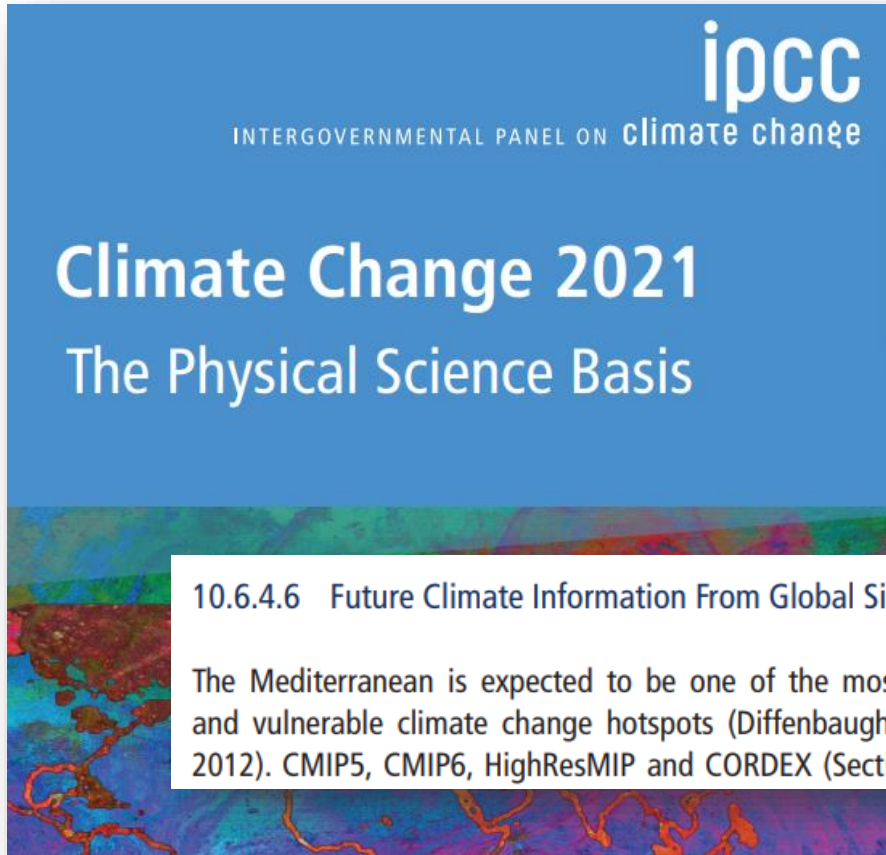
<https://press.un.org/en/2022/sgsm21228.doc.htm>

- This assertion is illustrated by
  - (a) the decision of the European Parliament (Nov. 2019),
  - (b) the creation of the Ministry of Climate Crisis in Greece (Sep. 2021) and
  - (c) the announcement of the UN (Apr. 2022)
- **Question:** Which one is a bigger threat?
  - ❑ A natural climate crisis?
  - ❑ Or a political "climate crisis"?

# Domains of presentation



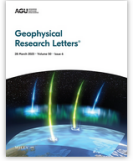
# Why Mediterranean?



## Geophysical Research Letters\*

Climate | [Free Access](#)

Heat stress intensification in the Mediterranean climate change hotspot



Review

### A Literature Review of Climate-Related Coastal Risks in the Mediterranean, a Climate Change Hotspot



Earth System Dynamics

Article

Articles / Volume 13, issue 1 / ESD, 13, 321–340, 2022

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Research article | | 08 Feb 2022

### The Mediterranean climate change hotspot in the CMIP5 and CMIP6 projections

# Why Greece?

- The Greek government is proud for the important innovation of establishing the Ministry of Climate Crisis.
- Currently, neither Italy, nor France, nor Spain have such ministries.

<https://civilprotection.gov.gr/klimatiki-krisi>  
(Automatically translated to English)



The establishment of the Ministry of Climate Crisis and Civil Protection (September 2021) is an **important innovation of our country**.

# Part A

## Global hydrology



The screenshot shows the top portion of a web page for the journal 'Hydrology and Earth System Sciences'. At the top left is the EGU logo (European Geosciences Union). To its right is the journal title 'Hydrology and Earth System Sciences'. Below the journal title is a navigation bar with links: 'ARTICLES & PREPRINTS', 'SUBMISSION', 'POLICIES', 'PEER REVIEW', 'EDITORIAL BOARD', 'ABOUT', and 'EGU PUBLICATIONS'. The main content area features a large banner image of a desert landscape with the word 'Article' overlaid in white. Below the banner, there is a search bar and a navigation menu with buttons for 'Article', 'Peer review', 'Metrics', and 'Related articles'. The article's DOI is <https://doi.org/10.5194/hess-24-3899-2020>. The copyright notice reads '© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.' The article is identified as a 'Research article | Highlight paper | ©' and is dated '07 Aug 2020'. The title of the article is 'Revisiting the global hydrological cycle: is it intensifying?'. The author's name is 'Demetris Koutsoyiannis' with an email icon. On the right side of the article preview, there is a small thumbnail image showing a hydrological cycle diagram with various components like clouds, sun, rain, and buildings.

EGU European Geosciences Union

Hydrology and Earth System Sciences

ARTICLES & PREPRINTS SUBMISSION POLICIES PEER REVIEW EDITORIAL BOARD ABOUT EGU PUBLICATIONS

Article

Articles / Volume 24, issue 8 / HESS, 24, 3899–3932, 2020

Search

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<https://doi.org/10.5194/hess-24-3899-2020>  
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Research article | Highlight paper | ©

07 Aug 2020

### Revisiting the global hydrological cycle: is it intensifying?

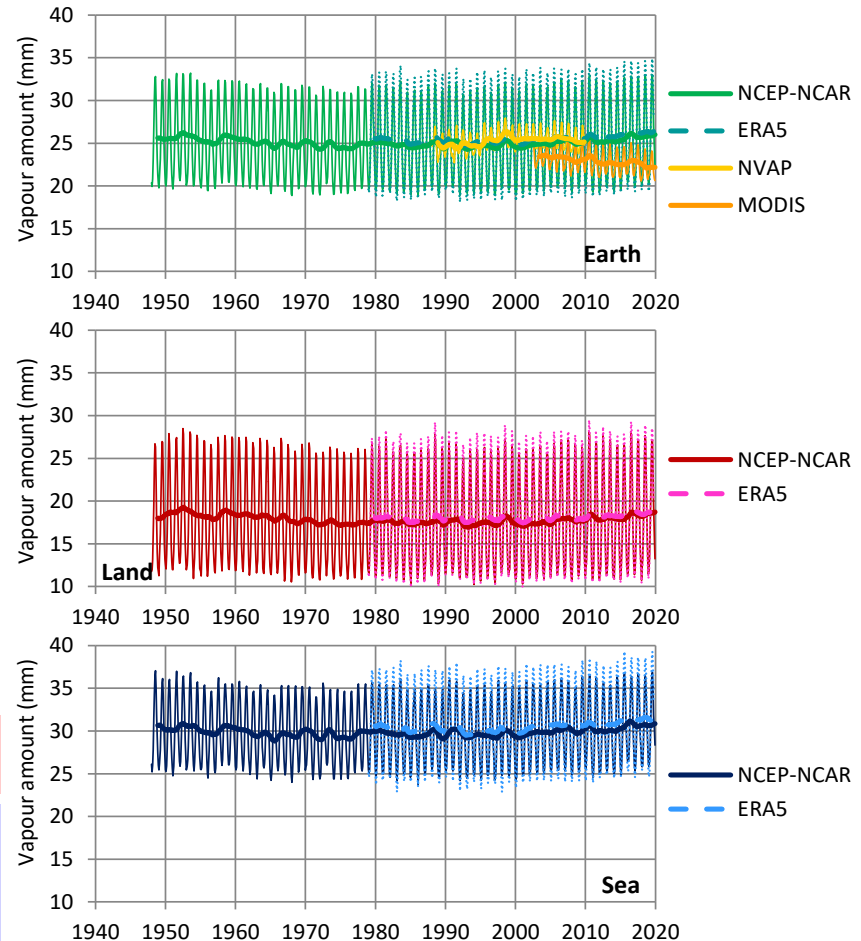
Demetris Koutsoyiannis ✉

# Does atmospheric water show intensification of hydrological cycle?

- IPCC (2013,2021) conjectured that the **water vapour** amount in the atmosphere **would increase** and the **hydrological cycle would intensify**.
- However, the water vapour amount is fluctuating—not increasing monotonically (**prediction falsified**).

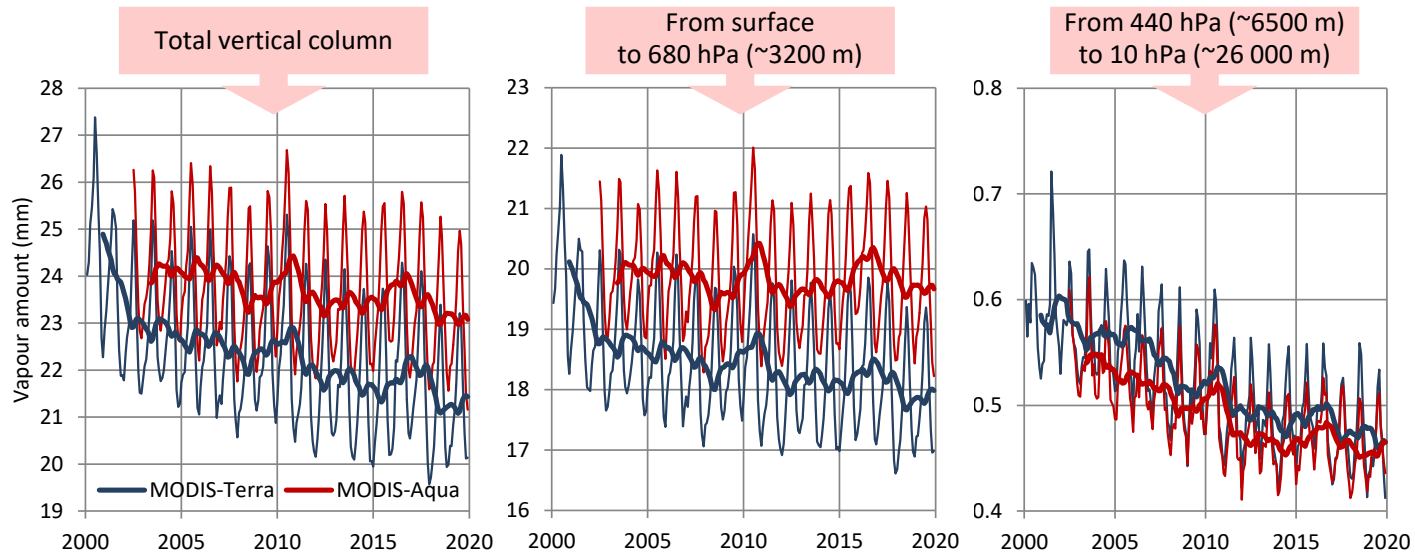
Thin and thick lines of the same colour represent monthly values and running annual averages (right aligned), respectively.

Source of graph: Koutsoyiannis (2020); reanalysis data (NCEP-NCAR & ERA5): <http://climexp.knmi.nl>; satellite data, NVAP: Vonder Haar et al. (2012) (Figure 4c, after digitization); satellite data, MODIS: <https://giovanni.gsfc.nasa.gov/giovanni/>; averages from Terra and Aqua platforms.



# Do satellite data of the 21st century show increasing presence of water vapour amount?

- Both Terra and Aqua satellite platforms for all atmospheric levels suggest **decreasing** trends.
- Hence, the data are **opposite to the IPCC conjecture**. Apparently, this suggests that climate models do not represent the physics correctly.



Source of graph: Koutsoyiannis (2020); MODIS data:  
<https://giovanni.gsfc.nasa.gov/giovanni/>

Thin and thick lines of the same colour represent monthly values and running annual averages (right aligned), respectively.



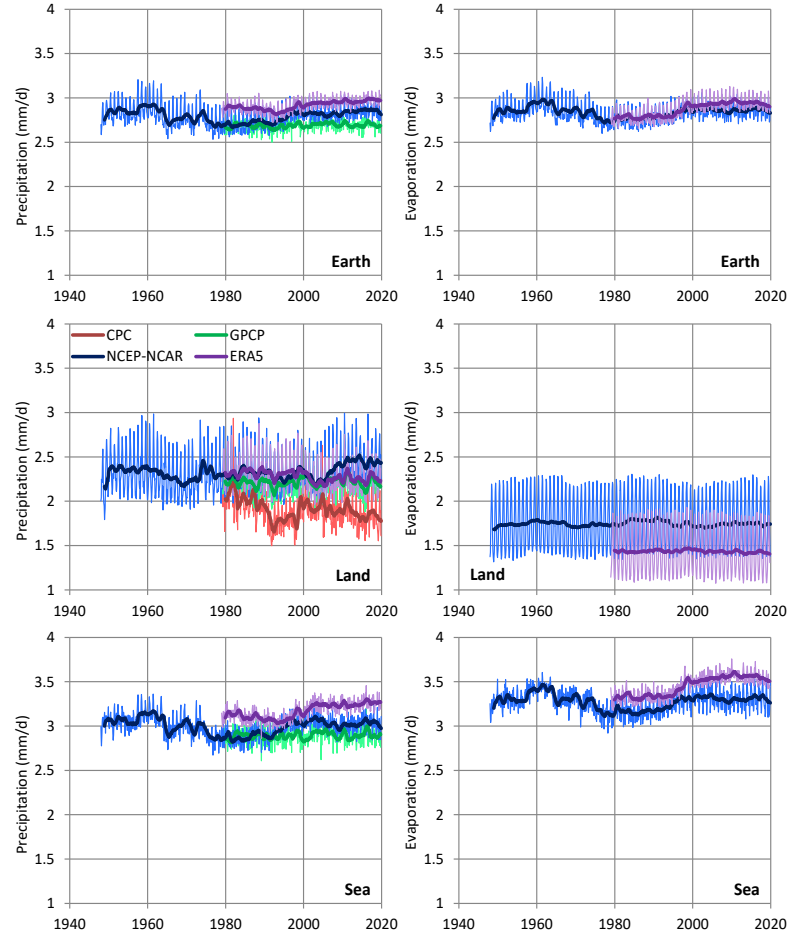
# Do precipitation and evaporation increase?

- Both precipitation and evaporation are **fluctuating**—not increasing monotonically.
- Hence, **the IPCC conjecture is falsified.**

Thin and thick lines of the same colour represent monthly values and running annual averages (right aligned), respectively.

Source of graph: Koutsoyiannis (2020); reanalysis data (NCEP-NCAR & ERA5), gauge-based precipitation data gridded over land (CPC), and combined gauge and satellite precipitation data over a global grid (GPCP):

<http://climexp.knmi.nl>



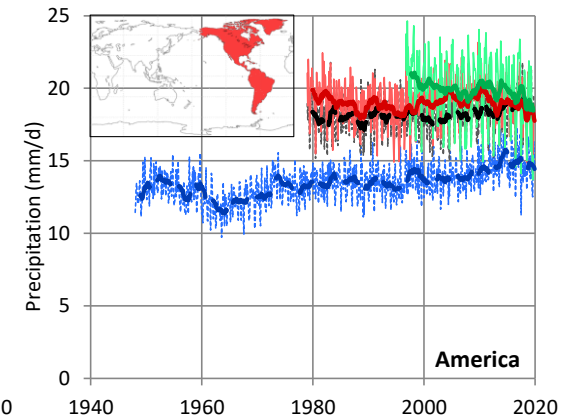
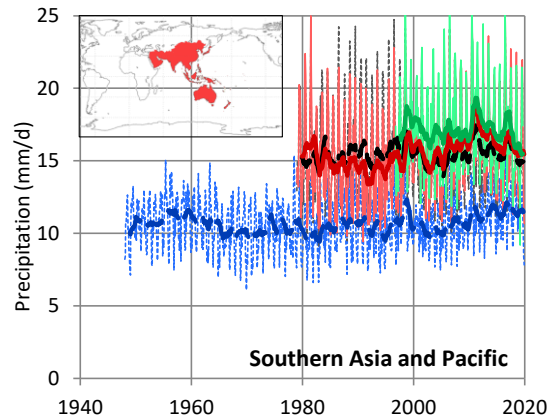
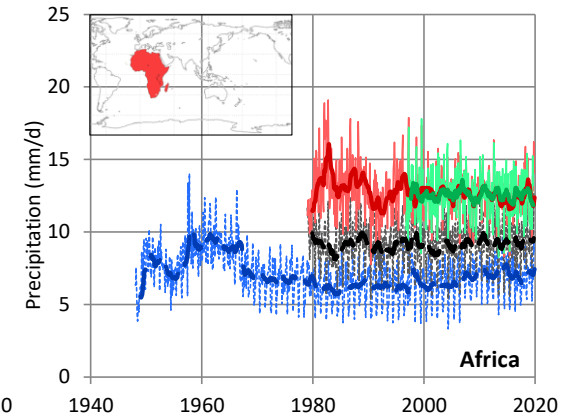
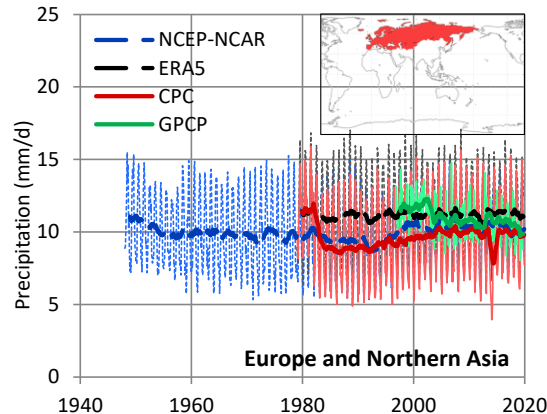
# Is monthly maximum daily precipitation increasing?

- The graphs show the variation of an index of **extreme rainfall**, which is the monthly maximum daily precipitation, areally averaged over the continents.
- In all continents, this index is **fluctuating**—not increasing monotonically.
- In particular, the satellite observations show **decreasing**, rather than increasing trends in the 21st century.

Thin and thick lines represent monthly values and running annual averages (right aligned).

Source of graph: Koutsoyiannis (2020); reanalysis data (NCEP-NCAR & ERA5, gauge-based precipitation data gridded over land (CPC), and combined gauge and satellite precipitation data over a global grid (GPCP):

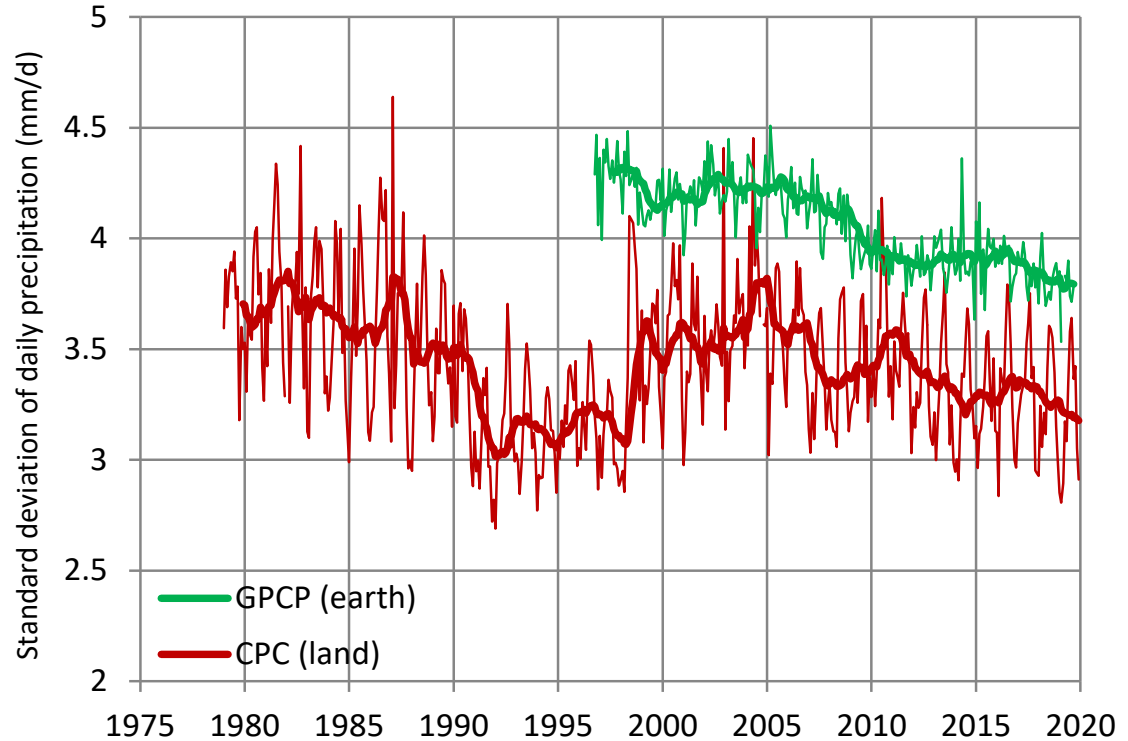
<http://climexp.knmi.nl>



# Is daily precipitation variability increasing?

- The standard deviation of daily rainfall, areally averaged, as seen both from CPC and GPCP observational data, decreases, thus **signifying deintensification of extremes** in the 21st century.
- Again, it will be more prudent to speak about **fluctuations** rather than deintensification.

Thin and thick lines of the same colour represent monthly values and running annual averages (right aligned), respectively.



Source of graph: Koutsoyiannis (2020); gauge-based precipitation data gridded over land (CPC), and combined gauge and satellite precipitation data over the entire Earth (GPCP): <http://climexp.knmi.nl>

# Have droughts been affected by humans?

From the abstract: “No evidence is found for any systematic trend in precipitation deficits attributable to anthropogenic climate change...”



## The Spatial Scale Dependence of The Hurst Coefficient in Global Annual Precipitation Data, and Its Role in Characterising Regional Precipitation Deficits within a Naturally Changing Climate

by Enda O'Connell <sup>1</sup>, Greg O'Donnell <sup>1</sup> and Demetris Koutsoyiannis <sup>2</sup>  
*Hydrology* 2022, 9(11), 199; <https://doi.org/10.3390/hydrology9110199>

Hurst's seminal characterisation of long-term persistence (LTP) in geophysical records more than seven decades ago continues to inspire investigations into the Hurst phenomenon, not just in hydrology and climatology, but in many other scientific fields. Here, we present a new theoretical development based on stochastic Hurst-Kolmogorov (HK) dynamics that explains the recent finding that the Hurst coefficient increases with the spatial scale of averaging for regional annual precipitation. We also present some further results on the scale dependence of  $H$  in regional precipitation, and reconcile an apparent inconsistency between sample results and theory. LTP in average basin scale precipitation is shown to be consistent with LTP in the annual flows of some large river basins. An analysis of the crossing properties of precipitation deficits in regions exhibiting LTP shows that the Hurst coefficient can be a parsimonious descriptor of the risk of severe precipitation deficits. No evidence is found for any systematic trend in precipitation deficits attributable to anthropogenic climate change across the regions analysed. Future precipitation deficit risk assessments should, in the first instance, be based on stochastic HK simulations that encompass the envelope of uncertainty synonymous with LTP, and not rely exclusively on GCM projections that may not properly capture long-term natural variability in the climate.

### 4.3. Characteristics Of Precipitation Deficits For The Eight Ltp Regions

The analysis of the crossing properties of average regional precipitation deficits using the 1900–2013 data set shows that some regions encountered deficits predominantly in the early part of the 20th century, while other regions were in surplus over the same period. The averages of the  $D$ ,  $SV$  and  $J$  statistics across the eight regions for each year suggest that there is a levelling up of the crossings between the first and second half of the record (Figure 12), and with relatively low volumes in the middle period. The grand averages for Periods 1–3 (Table 5(i) and Figure 13(i)) do not suggest that there is any intensification of precipitation deficits in Period 3 that might be attributed to ACC. On the contrary, the statistics suggest that Period 1 is characterised by more severe deficits, with the lowest deficits and intensities below the MSD level in Period 2.

### 4.4. Precipitation Deficits, Droughts And Anthropogenic Climate Change

In analysing the evidence for any recent global warming influence on precipitation deficits, the IPCC [32] noted that, while some regions of the world had recorded strong precipitation deficits in recent decades, other regions had not. They noted that global studies had generally shown no significant trends in SPI time series, and in derived drought frequency and severity data, and concluded that natural climatic variability is still the dominant mode of variability governing precipitation deficits and droughts, and, by implication, LTP. This conclusion is supported by our findings here, where we have not seen any clear evidence of intensification in precipitation data up to and including 2020 (Table 5 and Figure 13). Moreover, the narrative on causality continues to evolve [33,34,35,36].

O'Connell et al. (2022); see also <https://notrickszone.com/2023/02/20/random-probability-analysis-of-global-drought-data-affirm-no-pattern-can-be-linked-to-human-activity/>



Scientific investigations frequently start from the premise that ACC is an explanatory factor, and set out to prove it, whereas a more conventional scientific approach would be to adopt the Null Hypothesis that natural climatic variability is a causal factor, and to test the Alternative Hypothesis that it is ACC. In this regard, the use and misuse of trend tests, and the misunderstanding of stationarity have been analysed and discussed in a number of papers (e.g., [43,44,45,46]), and it is good to see that more considered approaches are now emerging in the literature (e.g., [47,48,49]). That ACC can be a factor influencing droughts is not in question, but based on current evidence, natural climatic variability remains the main driver of precipitation deficits in regions affected by LTP, but care is needed that apparent trends resulting from LTP are not misinterpreted as evidence of ACC.

From a multi-decadal analysis of the crossing properties, no evidence was found to show that there has been any increase in precipitation deficits in recent decades that might be attributable to global warming. Precipitation deficits are a consequence of natural climatic variability/the level of LTP, so the Hurst coefficient and HK stochastic simulations conditioned on a historic data set should be used to test water resource system resilience and robustness, and not rely exclusively on GCM projections that do not reproduce the LTP in observational records.

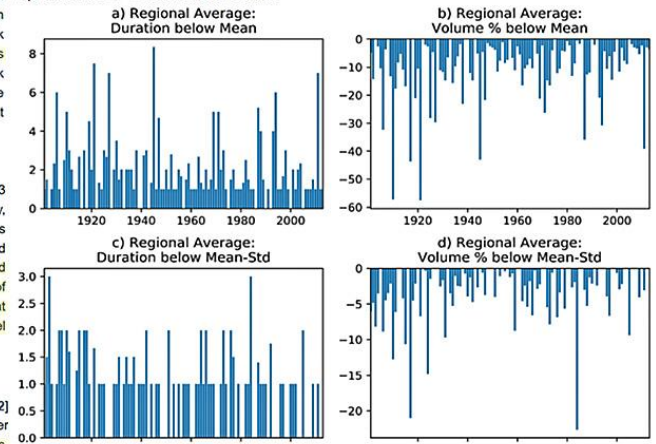


Figure 12. Regional averages of deficit duration and volume percentage for each year for the mean and MSD crossing levels, 1901–2013.

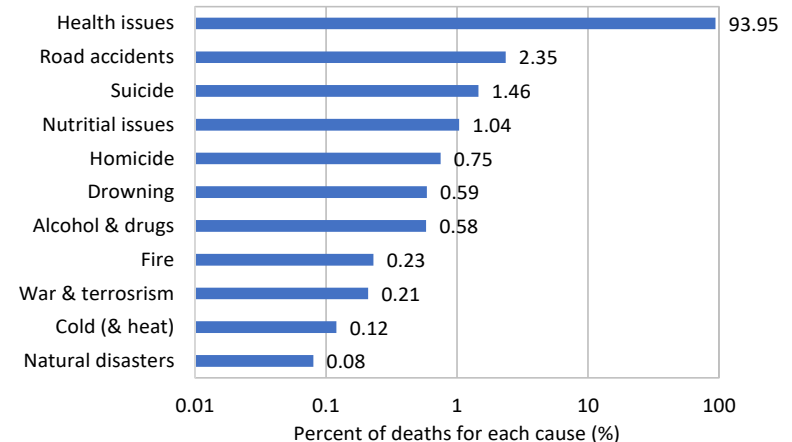
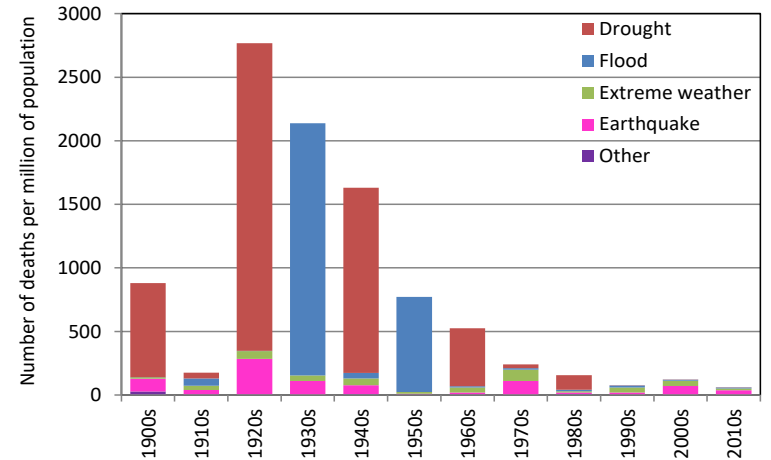
- Period 1: 1901–1938 (38 years)
- Period 2: 1939–1976 (38 years)
- Period 3: 1977–2013 (37 years)

# Have fatalities from climate-related disasters increased?

- The risk from natural disasters has been spectacularly decreased.
- Currently, it is in the bottom of the list of risks from all hazards.
- We owe that decrease to engineering and technology.
- Instead of casting pessimistic prophecies for the future, in the last century engineers improved hydro-technology, water management, and risk assessment and reduction.

Source: Koutsoyiannis (2022).

Data from <https://ourworldindata.org/world-population-growth>;  
<https://ourworldindata.org/ofdaced-international-disaster-data>

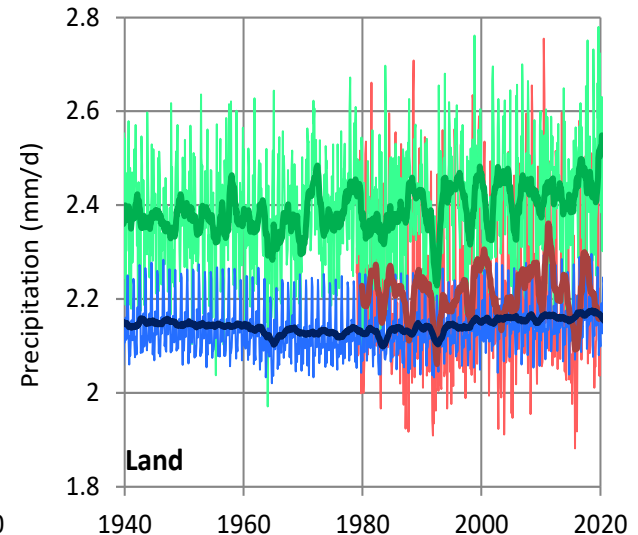
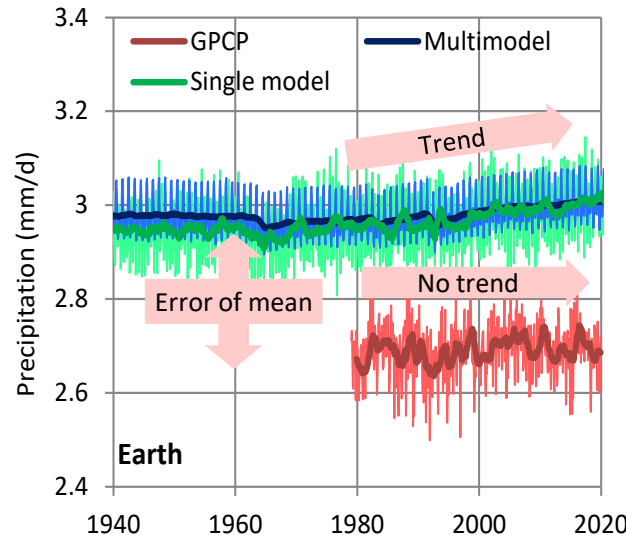


# Do climate models provide guidance for the future?

- Short answer: No.
- Long answer: They have not provided skill for the past. Notice: (1) the **large error** of the “Multimodel” ensemble in terms of the mean; (2) the increasing trend of climate model outputs after 1980, which **did not appear in reality**.

Thin and thick lines represent monthly values and running annual averages (right aligned).

Source of graph: Koutsoyiannis (2020); observations come from the combined gauge and satellite precipitation data over a global grid (GPCP); climate model outputs are for the scenario “RCP8.5” (frequently referred to as “business as usual”); “Multimodel” refers to CMIP5 scenario runs (entries: CMIP5 mean – rcp85) and “Single model” refers to CCSM4 – rcp85 (ensemble member 0), where CCSM4 stands for Community Climate System Model version 4, released by NCAR. Data and model outputs are accessed through <http://climexp.knmi.nl>



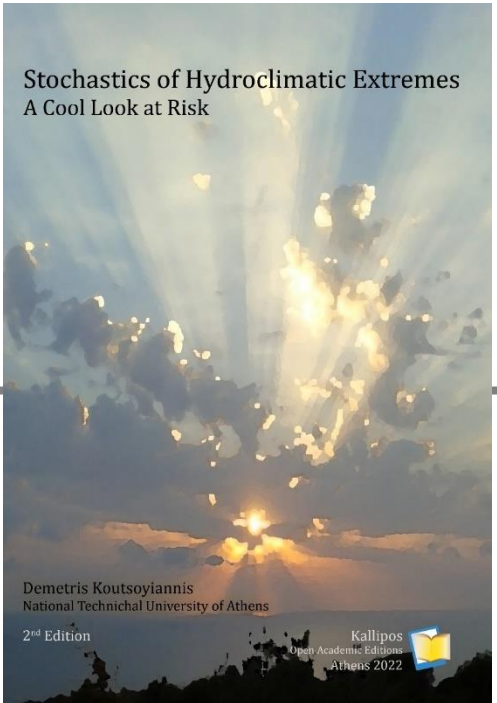
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# Part B

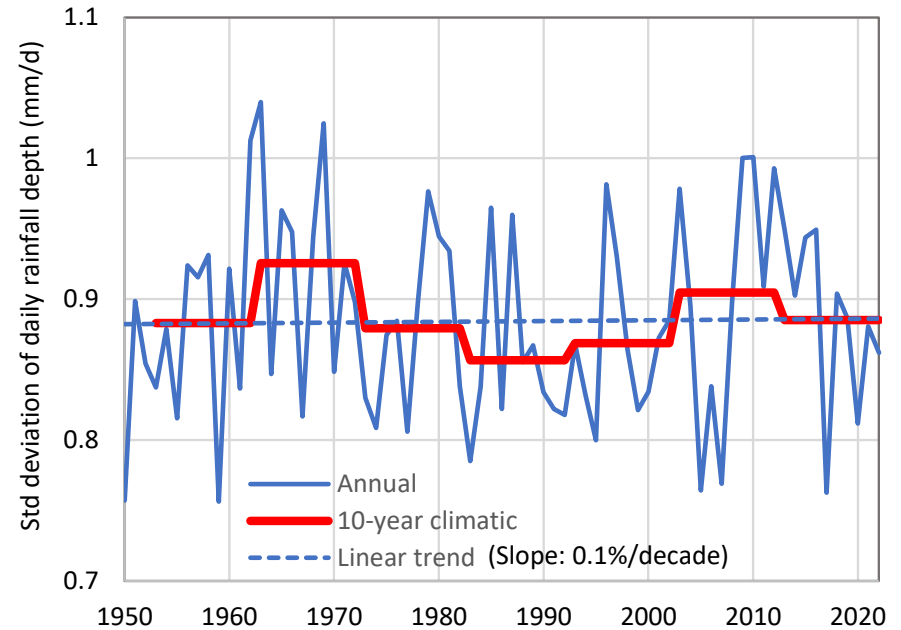
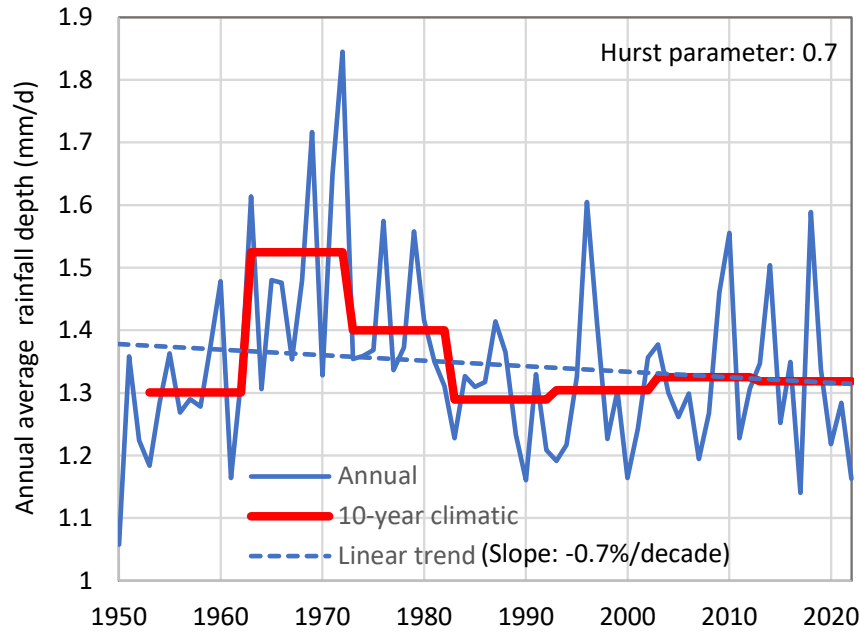
## Hydrology of the Mediterranean

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<https://www.itia.ntua.gr/2000/>



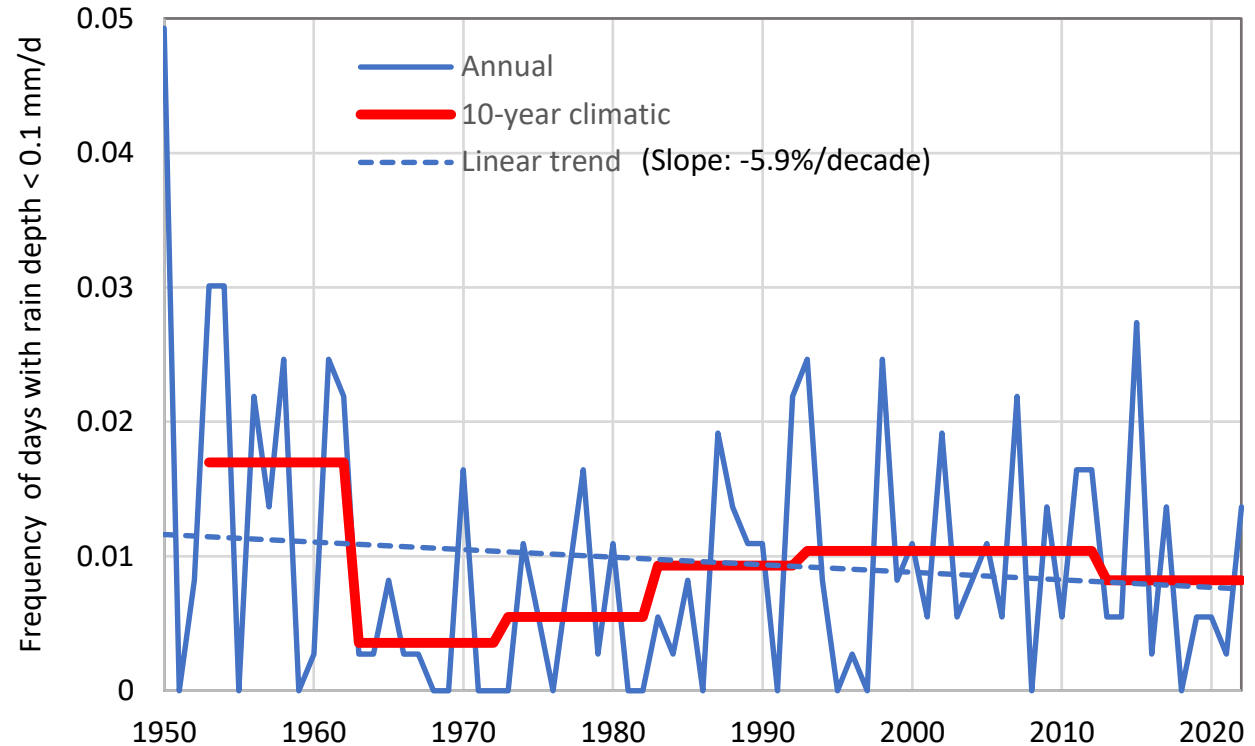
# Do rainfall data of the Mediterranean suggest a climate crisis at present and recent past?



**Source of data:** Daily gridded data from the European ERA5 reanalysis, <http://climexp.knmi.nl>. The data are averages for the area 30°N-46°N, 6°W- 36°E; the graphs are for land points only, but no essential difference appears if the sea points are also considered.

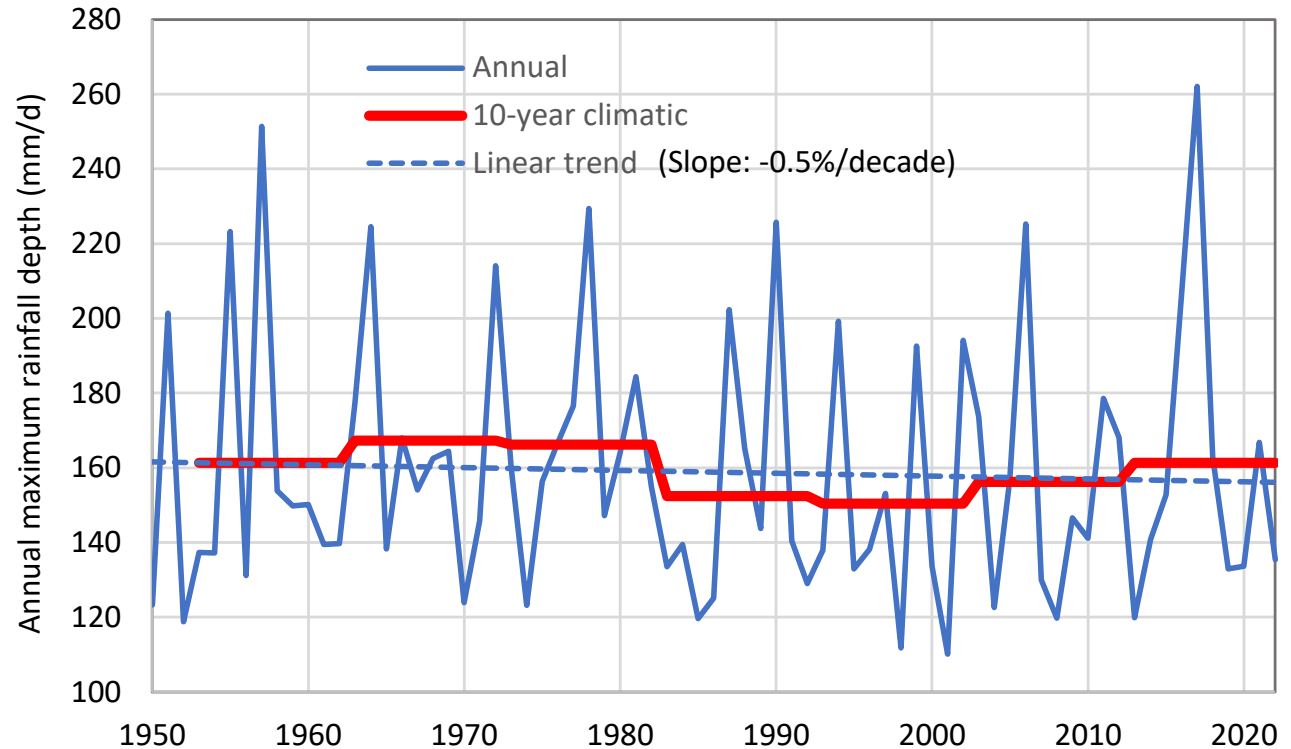


# Does rainfall frequency in the Mediterranean suggest unprecedented droughts at present and recent past?



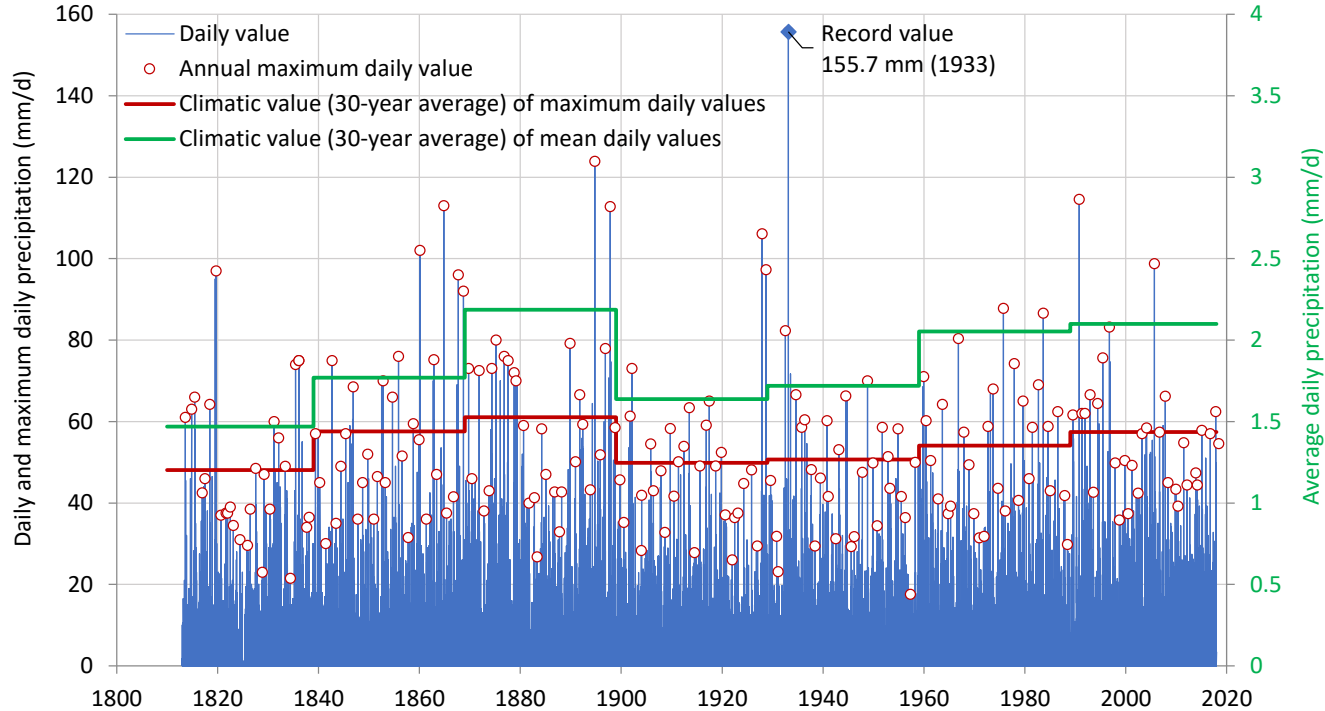
**Source of data:** Daily gridded data from the European ERA5 reanalysis, <http://climexp.knmi.nl>. The data are averages for the area 30°N-46°N, 6°W-36°, from which the number of days with average rainfall depth < 0.1 mm was calculated for each year; the graphs are for land points only, but no essential difference appears if the sea points are also considered.

# Does maximum rainfall in the Mediterranean suggest unprecedented intensities at present and recent past?



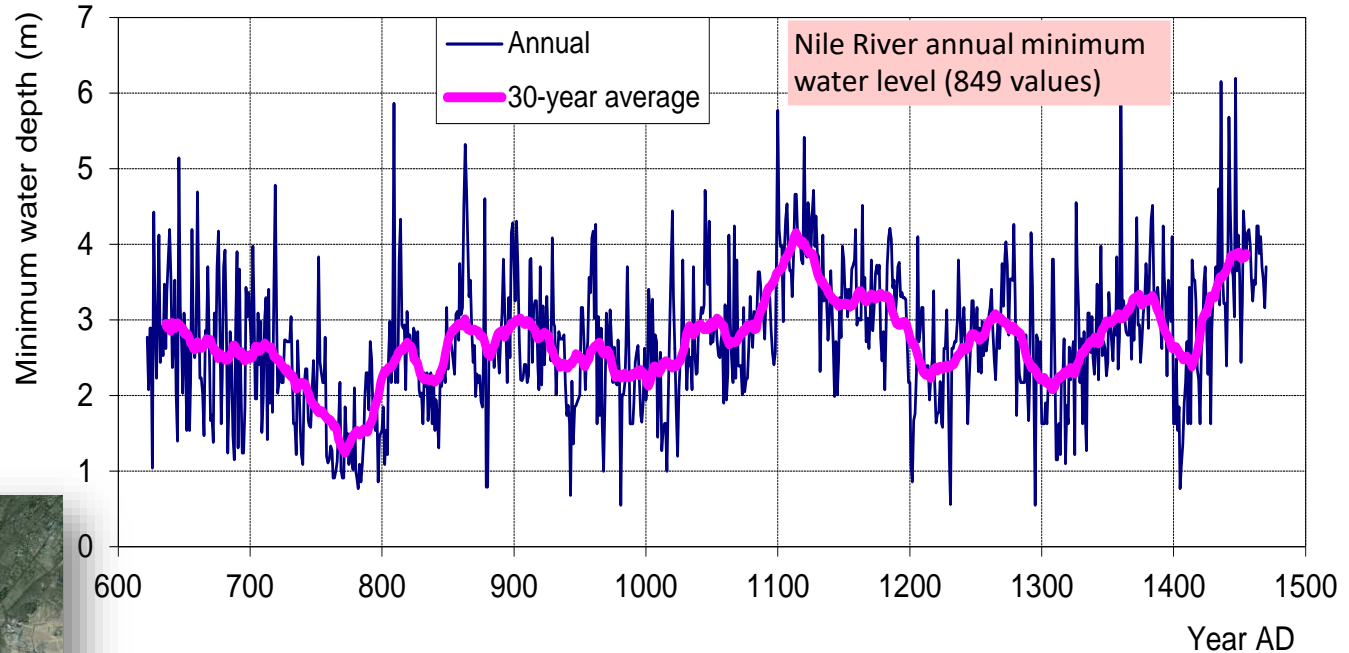
**Source of data:** Daily gridded data from the European ERA5 reanalysis, <http://climexp.knmi.nl>. The data are maxima for the area 30°N-46°N, 6°W-36°E; the graphs are for land points only, but no essential difference appears if the sea points are also considered.

# Do long rainfall records in the Mediterranean suggest unprecedented changes at present and recent past?



- Bologna, Italy: 206 years of data since 1813.
- Change is perpetual.
- This change can be described in terms of Hurst-Kolmogorov stochastic dynamics (Hurst parameter 0.86).

# What does the longest instrumental record on Earth say? The Roda Nilometer (849 years of Nile's water level)



Graph and data from Koutsoyiannis (2013); the data can be downloaded from <https://www.itia.ntua.gr/1351/>

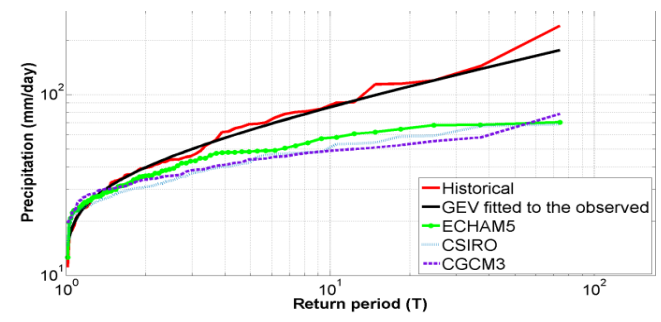
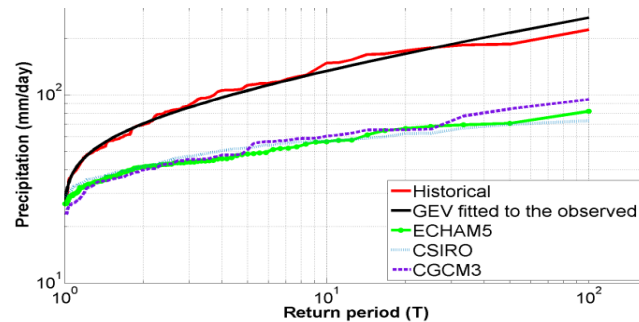
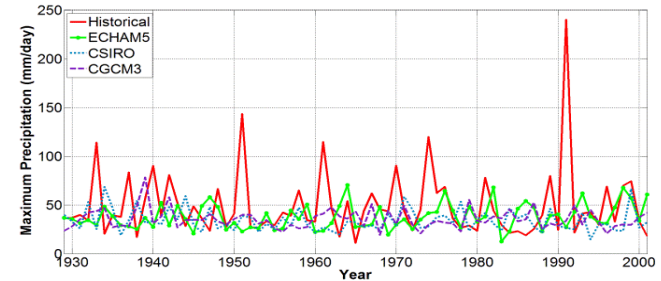
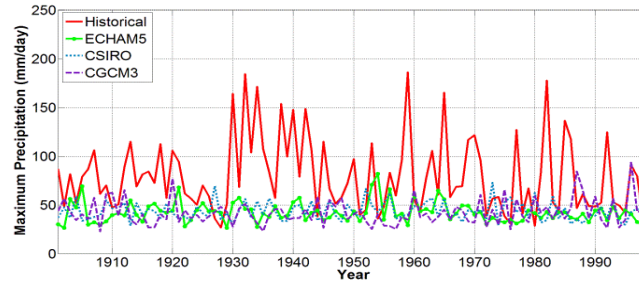
Photos by Loai Samen and Mohamd Mubarak; Google maps, <https://goo.gl/maps/T8NUgoDAorK2> and <https://goo.gl/maps/dsdJHJYVv572>

# Do climate models simulate the real-world rainfall extremes?

- Tsaknias et al. (2016—multirejected paper) tested the reproduction of extreme events by three climate models of the IPCC AR4 at 8 test sites in the Mediterranean which had long time series of temperature and precipitation.
- They concluded that model results are **irrelevant to reality** as they seriously underestimate extreme events.

Upper row: Daily annual maximum precipitation at Perpignan and Torrevieja; Lower row: empirical distribution functions of the data in upper row

Source: Tsaknias et al. (2016)



# Part C

## Hydrology of Greece

**Acknowledgment:** Special thanks to the *General Directorate of Water* of the Greek *Ministry of Environment and Energy* for the commissioning of the study and the collaboration.



ΥΠΟΥΡΓΕΙΟ  
ΠΕΡΙΒΑΛΛΟΝΤΟΣ  
& ΕΝΕΡΓΕΙΑΣ

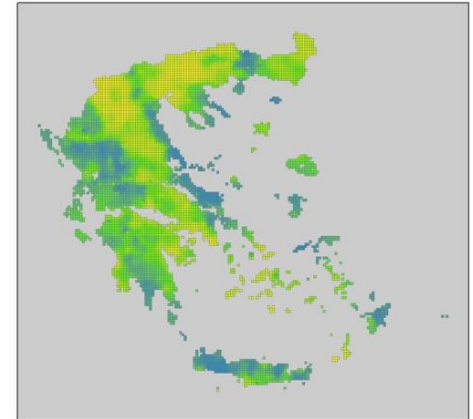


Ευρωπαϊκή Ένωση  
Ταμείο Συνοχής



ΕΣΠΑ  
2014-2020  
ανάπτυξη - εργασία - αλληλεγγύη

Παραγωγή χαρτών με τις επικαιροποιημένες παραμέτρους των  
όμβριων καμπυλών σε επίπεδο χώρας  
(εφαρμογή της Οδηγίας ΕΕ 2007/60/ΕΚ στην Ελλάδα)

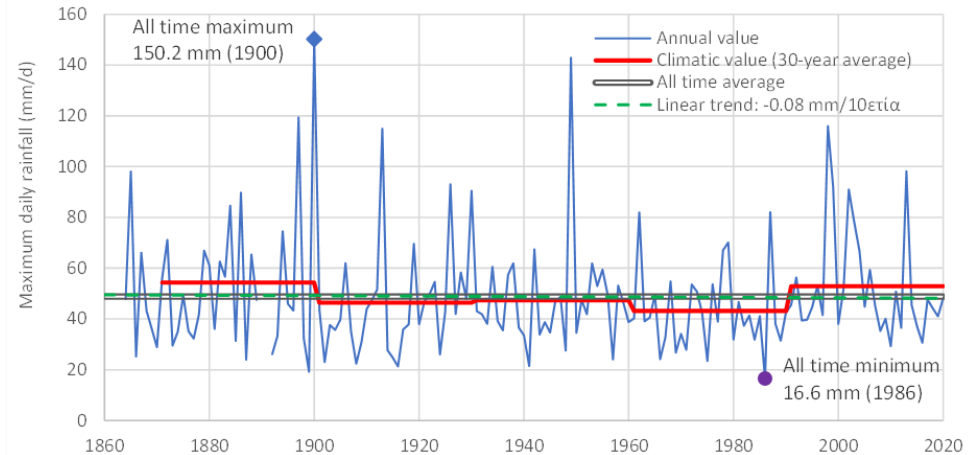
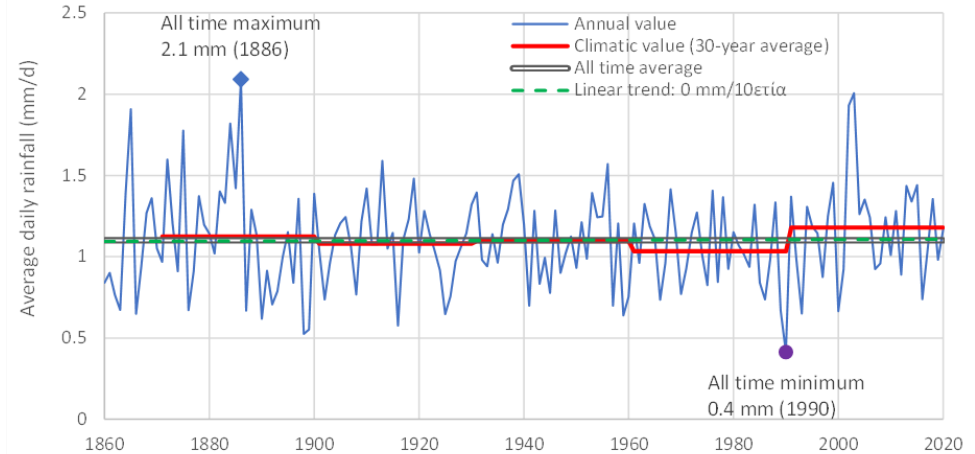


ΤΕΧΝΙΚΗ ΕΚΘΕΣΗ

Ανάθεση: Υπουργείο Περιβάλλοντος και Ενέργειας  
Εκπόνηση: Τομέας Υδατικών Πόρων και Περιβάλλοντος  
Εθνικό Μετσόβιο Πολυτεχνείο  
Επιστημονικοί υπεύθυνοι: Θεανώ Ηλιοπούλου & Δημήτρης Κουτσογιάννης

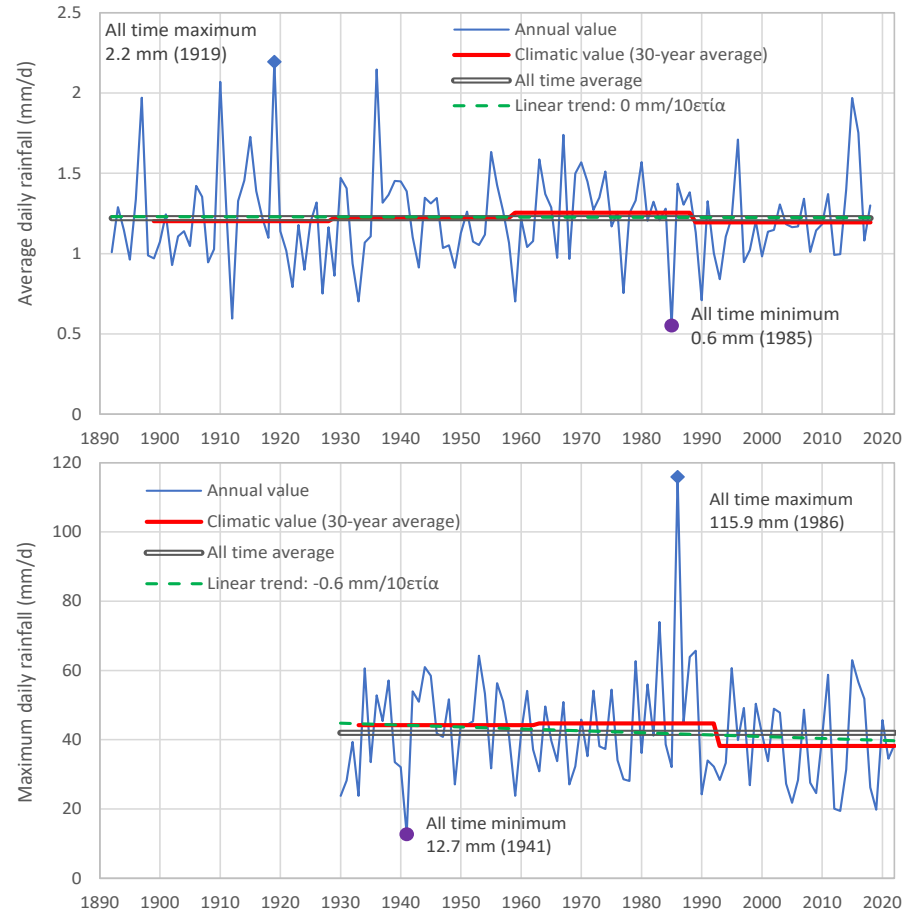
# What does the Athens rainfall time series, the longest in Greece, say?

- Compared to Bologna, Athens shows climate stability.
- In the last 30 years there has been no remarkable climatic event.
- The largest annual rainfall in history was recorded in the hydrological year 1885-86, and the smallest in 1989-90.
- The all-time high record of rainfall depth, 150.2 mm/d, occurred at the end of the 19th century (1899-90).



# What does the Thessaloniki rainfall time series, the second longest in Greece, say?

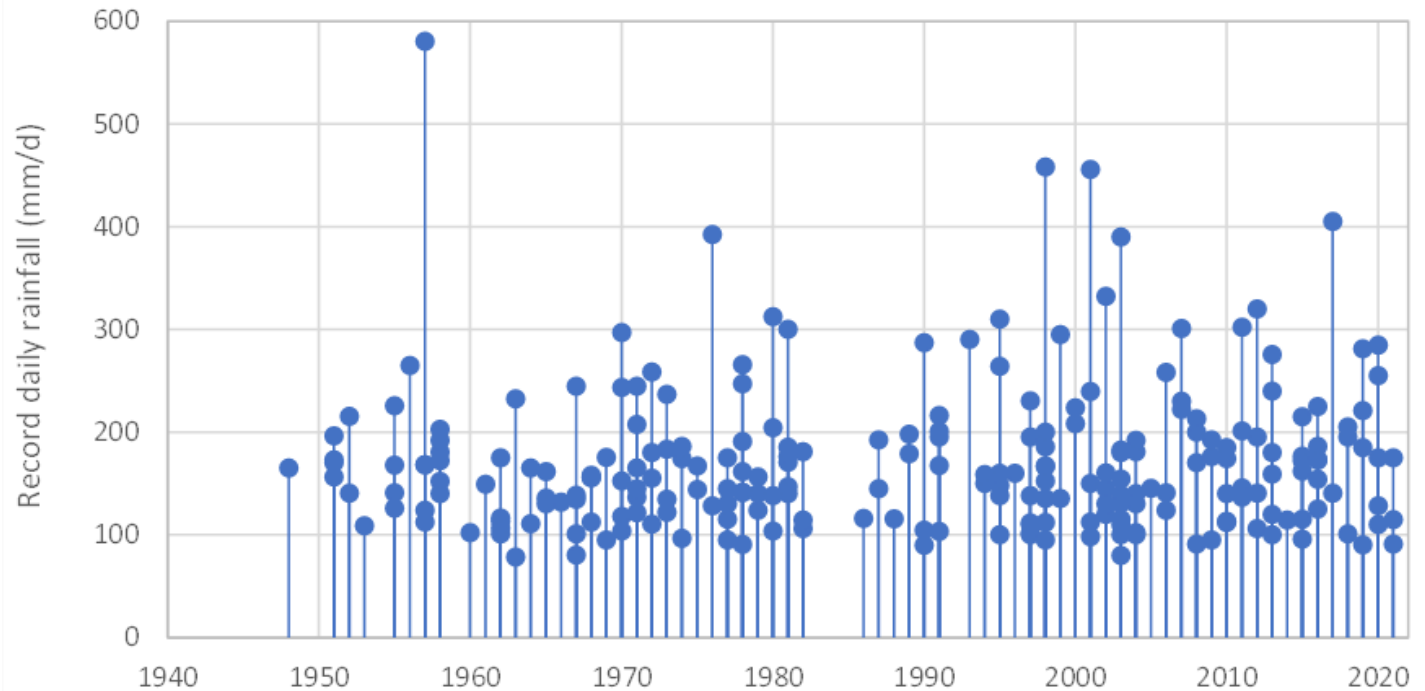
- Thessaloniki shows climatic stability, similar to Athens.
- In the last thirty years there has been no remarkable climatic event.
- The largest annual rainfall in history was recorded in the hydrological year 1918-19, and the smallest in 1984-85.
- The all-time high record of rainfall depth, 115.9 mm/d, occurred in the hydrological year 1985-86.





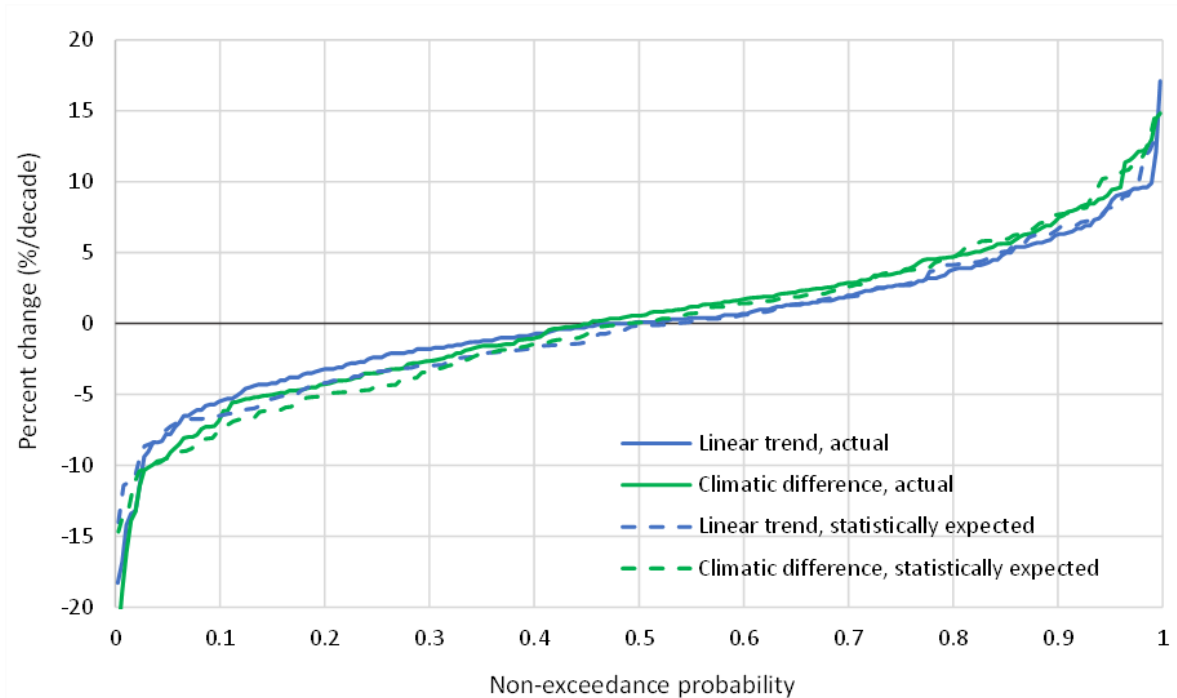
# When did the record high daily rainfall occur in the 238 stations with longest time series in Greece?

- The distribution is as statistically expected.
- An exception is the lack of a record in the three-year period 1982-83 to 1984-85.
- There are no noticeable climatic events.



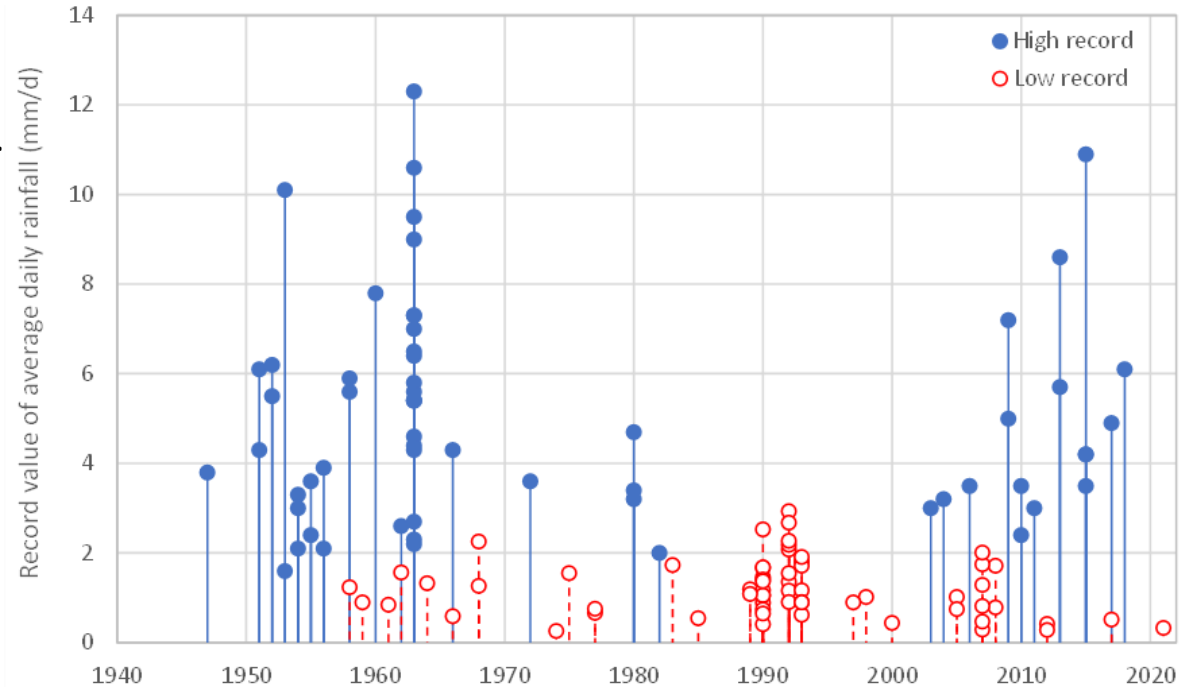
# Are there climatic trends in annual maximum daily rainfall?

- The graph shows linear trends in the last ~60 years and differences of two consecutive 30-year climatic periods.
- The probability distribution of positive and negative trends is balanced.
- There is an impressive agreement of the empirical variations with the theoretically expected for a stationary process.



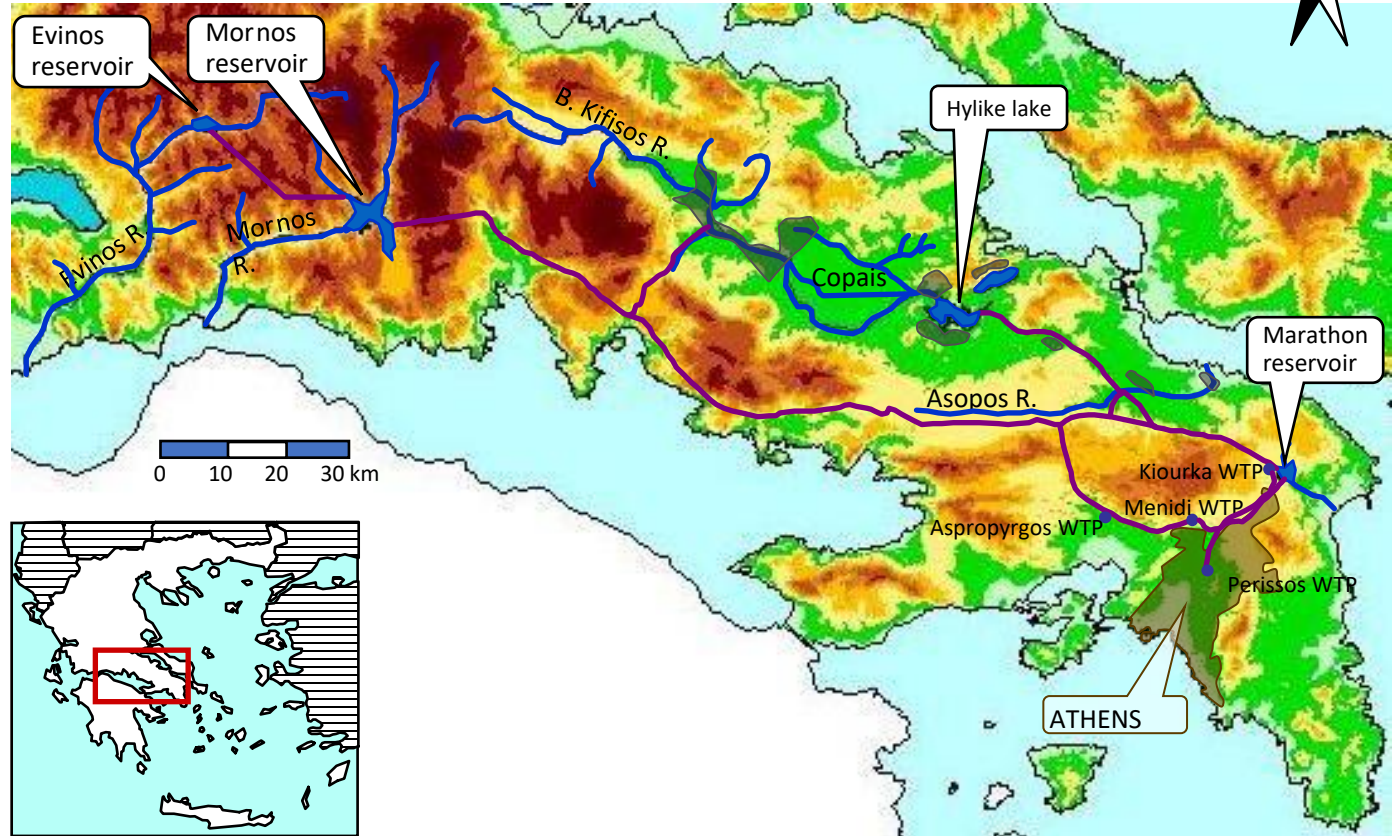
# When did the record high and record low annual rainfall occur in the 62 stations with longest complete daily time series in Greece?

- The 1950s and early 1960s were strongly wet.
- About 1/3 of the high records of annual rainfall occurred in a single hydrological year, 1962-63.
- The 20-year period centered in 1990 was remarkably dry.
- In particular, about half of the low records of annual rainfall occurred in the 5-year period centered in 1990.
- The other periods, including the current one, are climatically neutral.
- The entire picture suggests the presence of Hurst-Kolmogorov dynamics in time and space.



# In the 1990s people were not morons...

The Athens water supply system, completed during the long-lasting drought around 1990.



# In the 1990s people were not morons:

## Handling the long-lasting drought in Athens

- Close collaboration of (a) the National Technical University of Athens, (b) the Athens Water Supply and Sewerage Company (EYDAP), and (c) The Ministry of Environment and Public Works.
- Understanding that droughts are **regular natural events**—not associated to human influences.
- Proper modelling the drought within a **stochastic Hurst-Kolmogorov framework** (Koutsoyiannis, 2011).
- Development of a sophisticated **decision support system** (Koutsoyiannis et al., 2003).
- Transparency and veritable information to the **population** of Athens, and its **engagement in the management of the crisis**.
- Design and implementation of an increasing block rate **pricing structure**, combined with water **conservation legislation measures** (Xenos et al., 2002).
- Increased water supply through **technological measures** (see previous and next slide).

# In the 1990s people were not morons: Results of the crisis management

- **Not even in one house in not even one day** throughout this 7-year period was there a **water supply failure** due to the drought.
- The water **consumption** of Athens was **decreased by 1/3**.
- New groundwater resources were exploited.
- **In 1.5 year**, a new tunnel was constructed and operated, **diverting water from the Evinos River** to Athens.
- In another 4 years, the new dam on the Evinos River was completed, thus increasing the water quantity transferred to Athens.
- Now Athens has a perfect water supply system.



# A plausible scenario for handling the next drought in Athens

- The drought will be attributed to the **anthropogenic climate change**.
- It will be managed by the newly established **Greek Ministry of Climate Crisis**.
- Climate modellers will be appointed to run global and regional climate models, which will predict that the situation will be persistently worsening in the coming years.
- Urgent measures to **immediately shut down the lignite power stations** will be taken.

# Concluding remarks

- Hydrological data do not support the political doctrine of climate crisis—neither globally, nor in the Mediterranean and Greece.
- Change is Nature's style. It occurs at all times and all time scales.
- Change is unpredictable.
- *“The future is unknowable, but the past should give us hope”* (Winston Churchill, 1958).
- In the past, reason and adaptation have been the humans' response to change.
- If we return to reason, this will also be the case in the future.
- Technology has augmented the human ability of adaptation. The results have been spectacular in the last century.
- Human adaptation requires human intelligence. On the contrary, «μωρία» (moronity) results in devastation.



An aerial photograph showing a severe multi-vehicle accident on a multi-lane highway. Several large trucks, including a prominent blue one, are overturned and crushed. A large crowd of people is gathered on the shoulder, and numerous emergency vehicles, including fire trucks and ambulances, are present. The scene is chaotic, with debris scattered across the road and surrounding areas.

**Epilogue:**  
**Μωραίνει Κύριος ὃν βούλεται ἀπολέσαι**  
**Quem vult Deus perire dementat prius**  
**Whom God wishes to destroy, He first deprives of reason**

**Note:** The saying is an **ancient Greek proverb**, which is used in several versions also in Latin and in modern languages. Both **Sophocles** and **Euripides** provide some poetic variants of it, while the Latin version stems from **Publilius Syrus**. The verb «**μωραίνω**» of the Greek version has produced in English the words “**moron**” and “**moronity**”. A strong modern Greek version (from Epirus) is «*Πρώτα παίρνει ο Θεός τη γνώση, κι ύστερα το βιο*» (“*First God takes out the knowledge, and after the life*” where *life* includes also the *living*). See details in Politis (1902).

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