Comparing attribution studies on medicane Daniel

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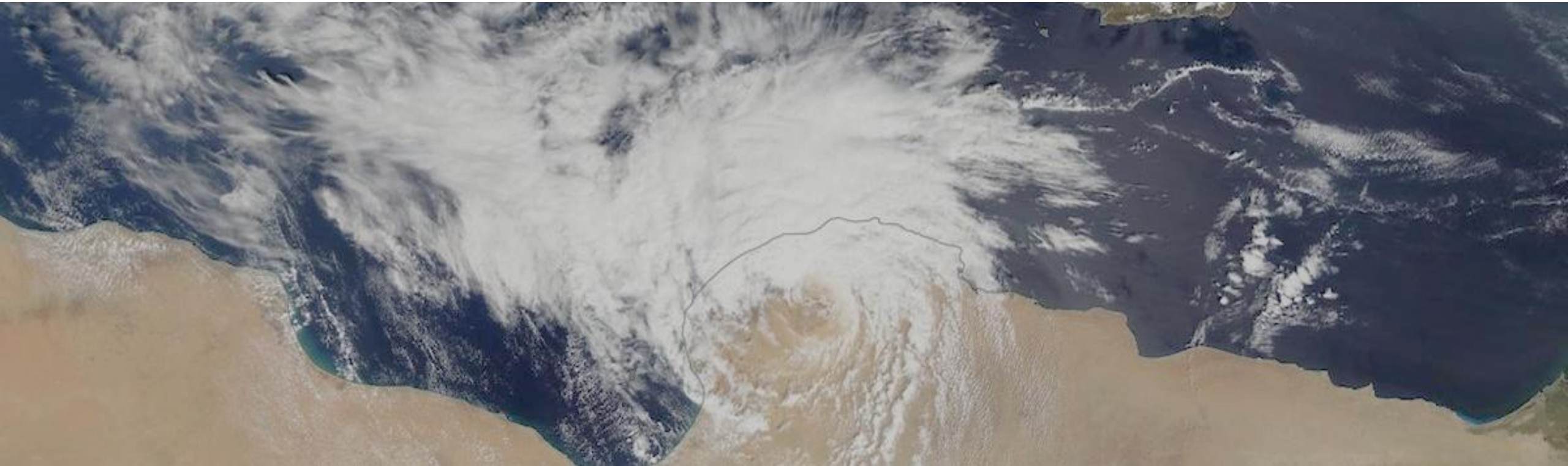
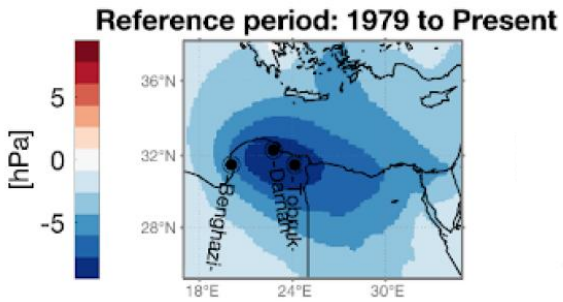


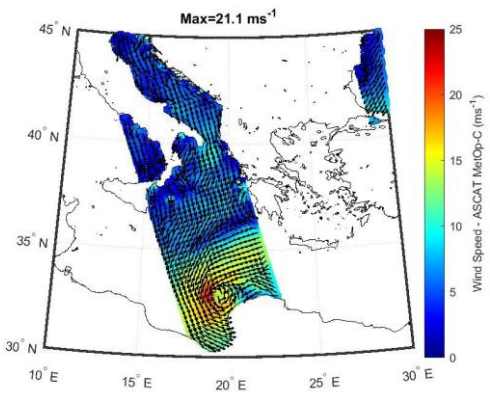
What is rapid attribution?

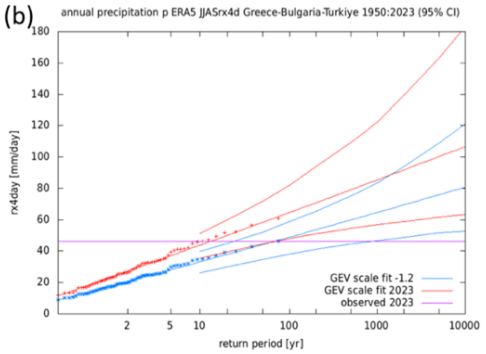
- Link between climate change & extremes
- Provides answers within days/weeks using peer-reviewed protocols

Did **climate change** make this event ***more likely*** or ***more intense***?

- Methods:
  - Fast analogues
  - Process studies
  - Probabilistic models
- Each with *strengths & limits*







Examples

ClimaMeter

- Timing: ~2 days
- Methods:
  - Dynamical analogues
  - Variable Analysis
- Data:
  - Reanalysis (ERA5)
  - Weather forecast
- Audience:
  - General public (Media Communication)

MedCyclones

- Timing: ~1 week
- Methods:
  - High-resolution observations and simulation
  - Variable Analysis
- Data:
  - Observations
- Audience:
  - Scientific community
  - Regional experts

WWA

- Timing: ~2 weeks
- Methods:
  - Statistical Approach
  - Model ensemble (existing simulations)
- Data:
  - Observations, surveys
  - Reanalyses, Models
- Audience:
  - General Public
  - Scientific and Social science

Case of study: medicane Daniel

- Medicane = “Mediterranean hurricane”
- Unique event from 4th to 12th, September 2023
- Different event definition for the storm:

ClimaMeter

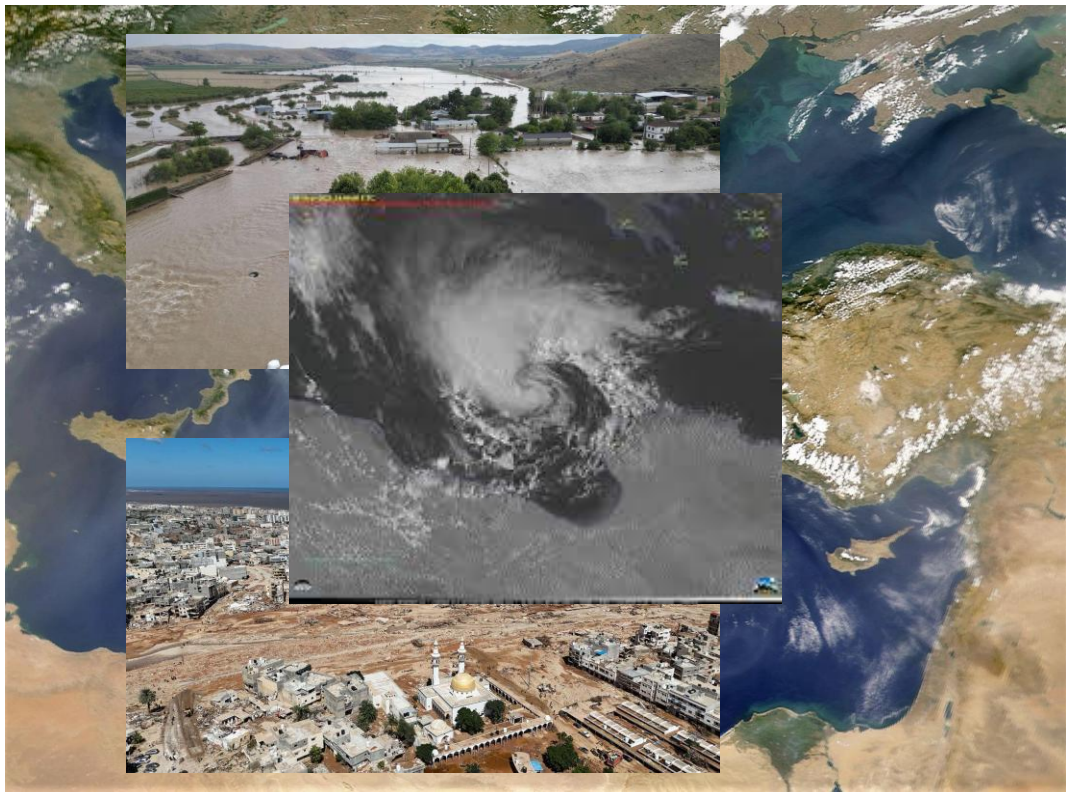
Analogues of sea-level pressure during Lybian landfall

MedCyclones

Analysis of different phases of the medicane

WWA

Average precipitation over 4 days and over a region including BGT and Lybia



Quantitative results

ClimaMeter

Climate change attribution

-Daniel was between 7 and 9 mm/day rainier in the present climate

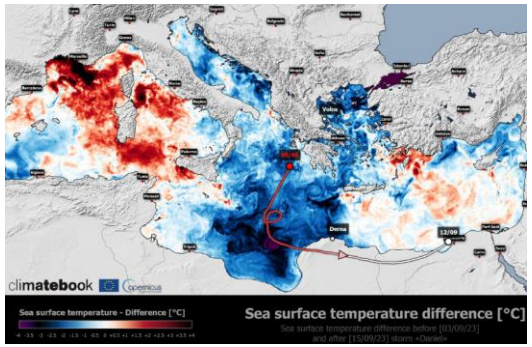
-Natural variability alone cannot explain the intensity of Daniel

MedCyclones

Climate change attribution

-No quantitative results but link between sea-surface temperature

- Increase in intensity of Daniel based on existing literature



WWA

Climate change attribution

-Daniel was 29% rain intensification but confidence intervals span from drier to wetter conditions

-Return period attribution from 1/600 year to 1/10 in present climate

Main conclusions

ClimaMeter

- Influence of large-scale natural climate variability
- Natural variability alone cannot justify the event
- **Largely unique event** in the data record

MedCyclones

- **Human-induced** climate change: intensification
- Lack of storm preparedness
- Lack of education on evacuation procedures

WWA

- **Human-induced** climate change: Intensification and likelihood increase
- High uncertainty: possibility of no detectable change
- Impact of floods due to human changes

Limitations

ClimaMeter

- Rely on analogue quality
- Largely unique event: cannot compare with previous events

MedCyclones

- Climate change is not directly addressed
- Relies only on literature

WWA

- Reliance on global climate models with limited Mediterranean resolution
- Event definition is oversimplified as it is average precipitation over an heterogeneous region

Media coverage

ClimaMeter

- The ClimaMeter site itself reports its media coverage: more than 150 press articles in 30 countries
- Concrete media-items listed (articles in MSN/Le Figaro, Repubblica, Carbon Brief, etc.)

MedCyclones

- The media room of MedCyclones shows interviews / commentary by researchers on extreme weather events attribution
- Low resonance on mass media
- MedCyclones publishes a report on Storm Daniel, describing the event, casualties, etc

WWA

- WWA claims “extensive media engagement” in many outlets: Guardian, Daily Mail, Times, Scientific American, CBS, BBC, etc.
- WWA is drawing worldwide coverage from hundreds of media outlets per month

Critical reflection

ClimaMeter

- Communication very fast, but nuance sometimes lost
- Broad audience, simplified discussion to make it understandable by the majority
- Importance on the main information, often lack of focus on uncertanties

MedCyclones

- High technical depth, but little direct media communication, reducing immediate public impact
- Restricted audience, more scientific language and higher details level

WWA

- Often complex problem described are fast-explained and oversimplified
- Referred to a broad audience, same limitations of ClimaMeter

Rapid attribution studies are essential for characterizing extreme climate events, but they inevitably carry uncertainties, both in the robustness of the results and in the effectiveness of the communication, especially when dealing with unique or unprecedented events

THANK YOU

Any questions?

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