Future extreme precipitation in the eastern Mediterranean: a new approach exploiting climate model projections

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- Extremes emerge as the tail of ordinary events
- Ordinary (vs. extreme) events are better represented in climate models
- Different synoptic systems respond differently to climate change

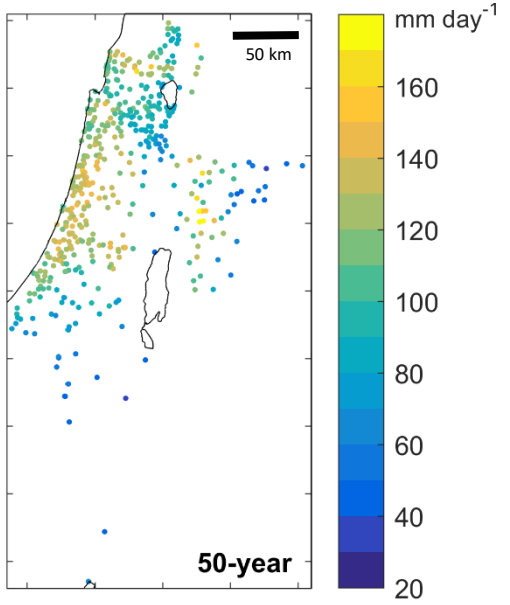
Rain gauges

Climate models

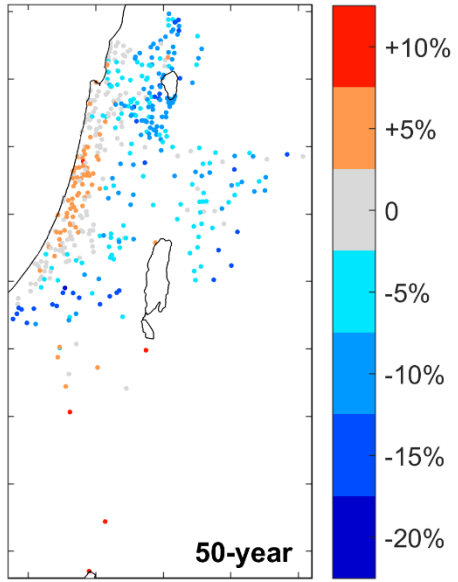
→ **Simplified MEV**
Marra & al. 2019
https://doi.org/10.1016/j.advwatres.2019.04.002 →

- Local information from rain gauges constrains the ordinary events distribution
- Average properties of future ordinary events from climate models are sufficient to project extreme return levels
- RCP8.5, end of the century projections (*Hochman & al 2018*, *Zappa & al 2015*)
  Mediterranean cyclones: $-20/25\%$ intensity, -25% yearly occurrence frequency
  active Red Sea troughs: -12% intensity, $+13\%$ yearly occurrence frequency

Observed 50-year return levels



Projected change



- Can be applied to any process whose extremes emerge from ordinary events
- Improves predictability of climate change details whose uncertainty was considered irreducible due to stochastic uncertainty

References
Hochman & al 2018, https://doi.org/10.1002/joc.5260
Marra & al 2019, https://doi.org/10.1016/j.advwatres.2019.04.002
Zappa & al 2015, https://doi.org\10.1007/s00382-014-2426-8

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