Universitat de les Illes Balears | Laboratori Interdisciplinari sobre Canvi Climàtic LINCC | Grup de Meteorologia

Experiencias del Grupo de Meteorología de la UIB en la proyección de extremos, con énfasis en el Mediterráneo

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Contenido

1. Técnicas dirigidas a VARIABLES : Combinación de regionalización dinámica y calibración local para el análisis de Tmax, Tmin y Pcp a escala diaria

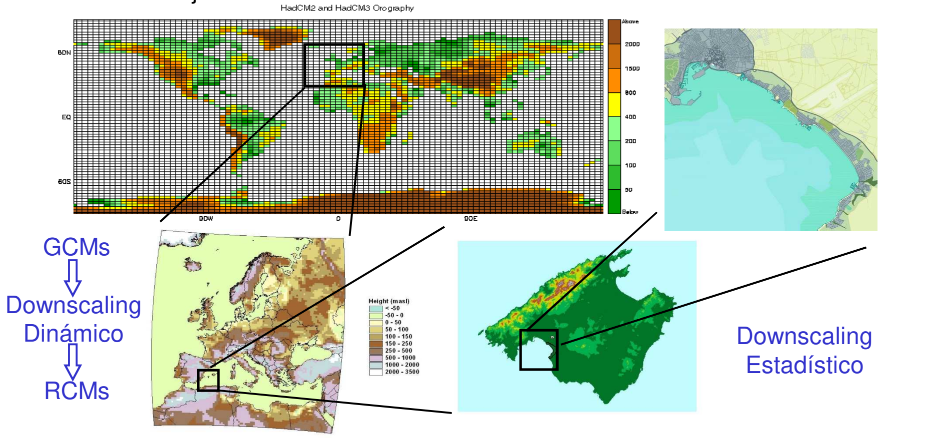
2. Técnicas dirigidas a FENÓMENOS : Generación sintética de un gran número de medicanes para una evaluación robusta del riesgo actual y futuro.

3. Algunas REFLEXIONES para la mesa redonda

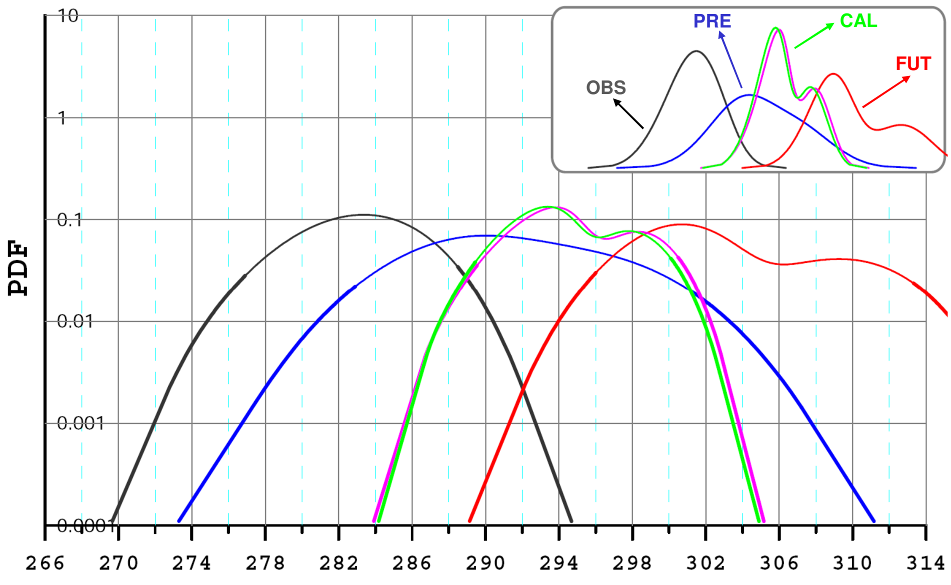
Método diseñado por el Grupo de Meteorología (UIB)

- GCMs → RCMs

- Escalas regionales: Downscaling dinámico con Modelos Climàticos Regionales (RCMs)
- Escala local: Ajuste estadístico mediante la corrección de los RCMs



14 modelos **EURO-CORDEX** / **RCP8.5** / **2071-2095** vs 1981-2005

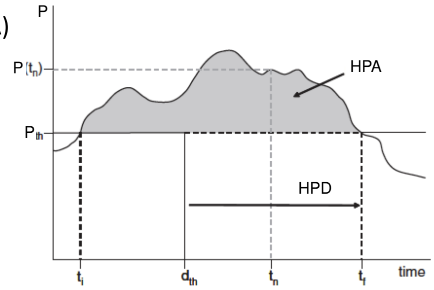


3.2 Extreme weather events

<u>3.2.3 Heavy precipitation</u>

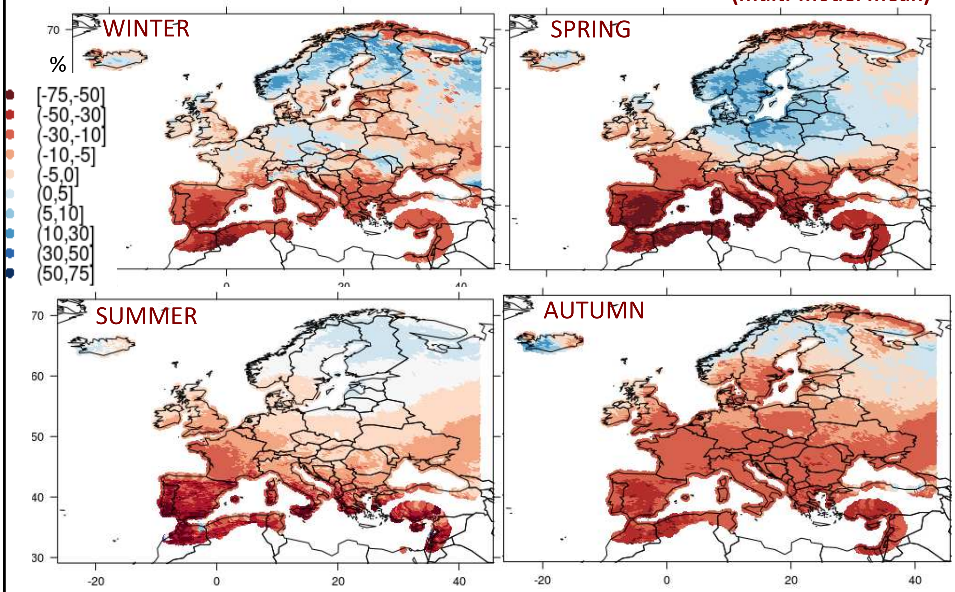
A spell lasting dth = 2 or more consecutive days with *daily precipitation* >= P95 of daily annual observed precipitation

1. Future change in seasonal precipitation days
2. Future events over P95 of daily annual observed precipitation
3. Heavy Precipitation Amplitude (HPA)

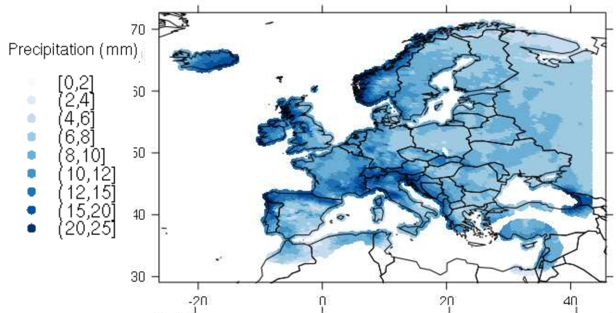


Seasonal precipitation days

FUTRURE CHANGE (multi-model mean)



P95 of daily precipitation (ANNUAL)



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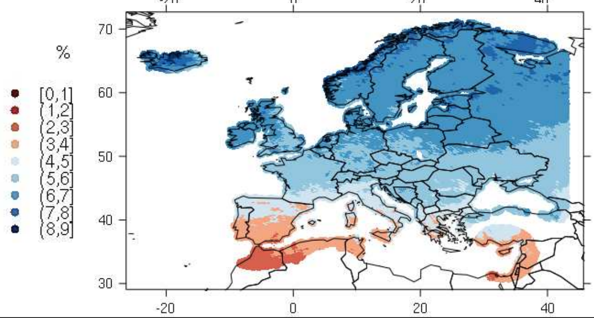
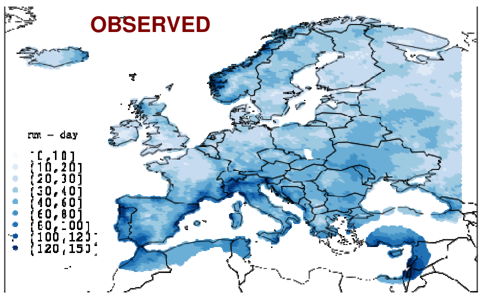


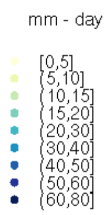
EVENTS OVER P95: Future (multi-model mean)

HEAVY PRECIPITATION AMPLITUDE

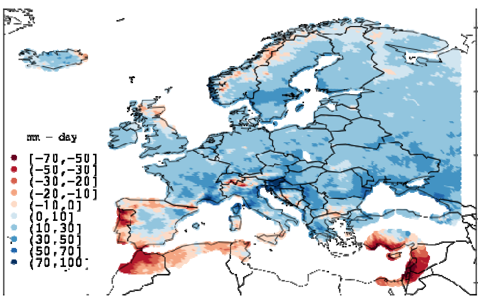
ANNUAL

OBSERVED

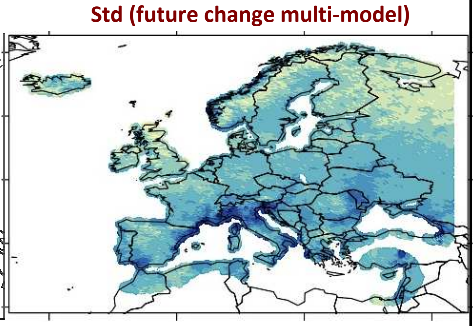




Future change (multi-model mean)

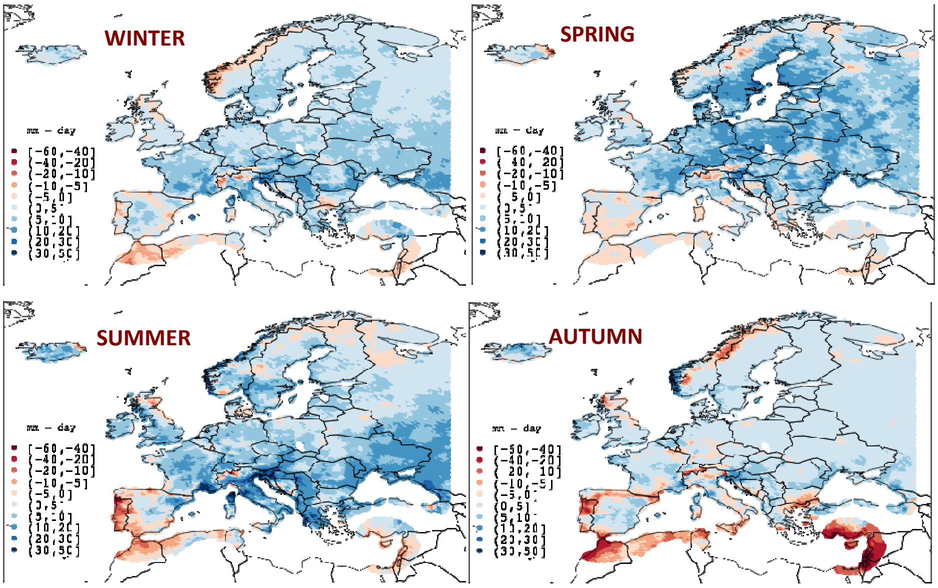


Std (future change multi-model)

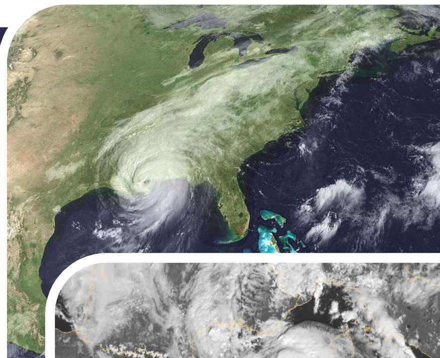


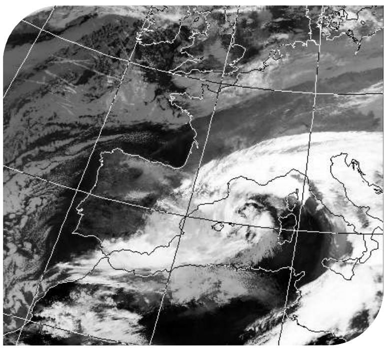
HEAVY PRECIPITATION AMPLITUDE (P95 ANNUAL)

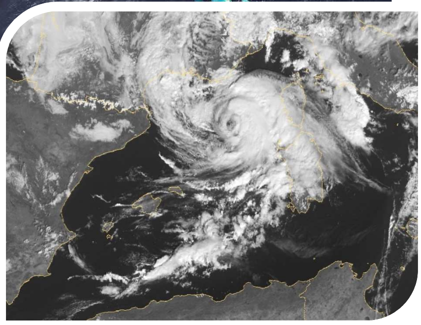
Future change (multi-model mean)



¿¿¿ **Frecuencia / intensidad futura de FENÓMENOS singulares (tormentas severas, borrascas extratropicales intensas, medicanes…) ??? …Proyecciones PROBLEMÁTICAS**



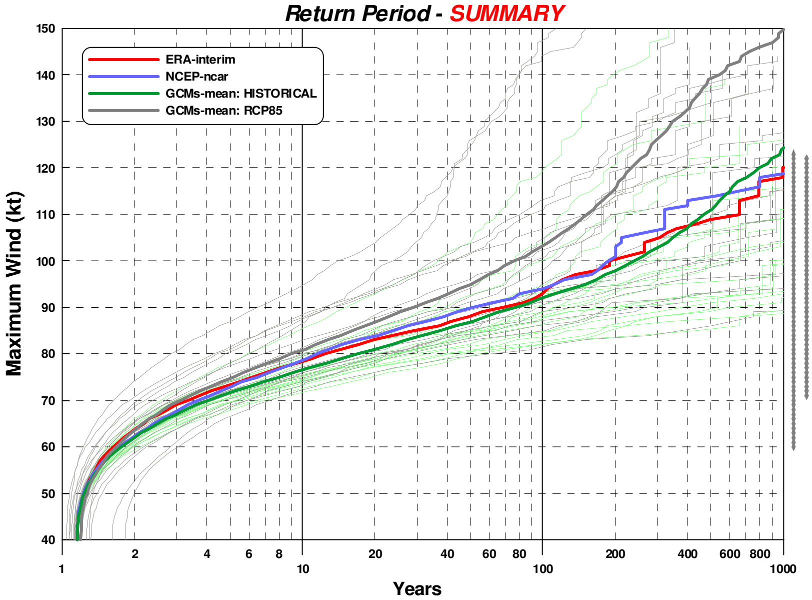


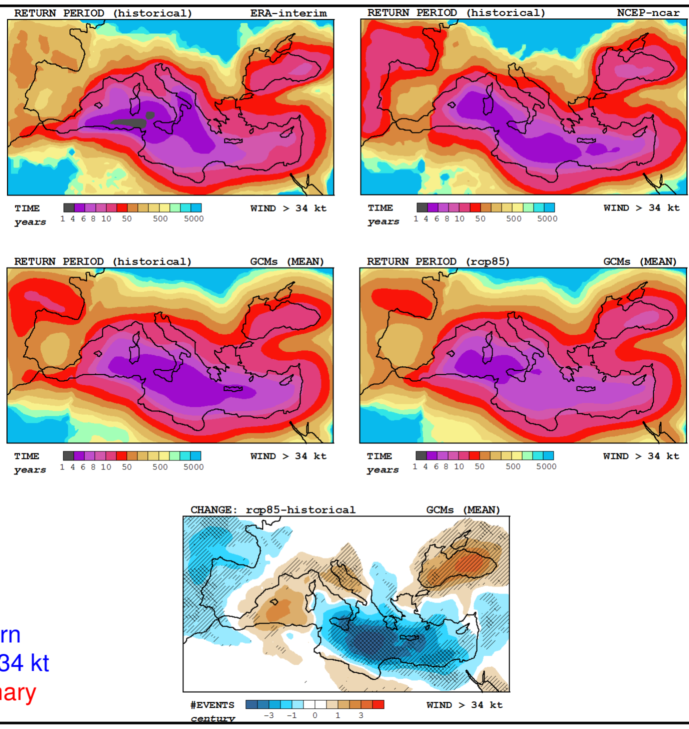


DOWNSCALING: *Método dinámico-estadístico*

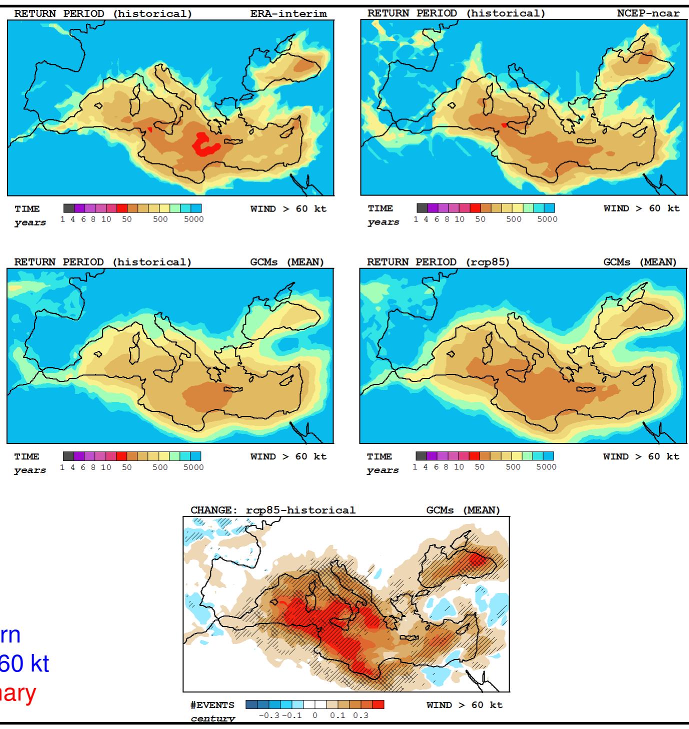
- ***Adaptación del método pionero de Kerry Emanuel (MIT, USA)***
- ***Generación de miles de huracanes sintéticos a bajo coste !!!***
- ***Evaluación del riesgo con gran robustez estadística (p.e. períodos de retorno viento extremo)***

Romero, R. and K. Emanuel, 2017: Climate change and hurricane-like extratropical cyclones: Projections for North-Atlantic polar lows and medicanes based on CMIP5 models. *J. Climate*, **30**, 279-299.





Return
Period 34 kt
Summary



Return
Period 60 kt
Summary

Conclusiones de la comisión de evaluación de AEMET con motivo de las lluvias torrenciales del 9 de octubre en Mallorca

La Agencia Estatal de Meteorología (AEMET) ha finalizado la evaluación interna realizada tras el episodio de lluvias torrenciales ocurrido en Mallorca el pasado 9 de octubre. Sus
7 conclusiones son:

→ 5. En un contexto de cambio climático y calentamiento global, cabe esperar un aumento en intensidad y frecuencia de los fenómenos meteorológicos adversos, especialmente en regiones como la mediterránea. Por tanto, la actualización y mejora de los sistemas de predicción y vigilancia es urgente y puede ser aún más necesaria en el futuro.

ARGUMENTOS FÍSICOS **vs** ***Simulaciones Numéricas (at VHR) !!!***

+ Proxies de gran escala

+ Suficiente muestreo estadístico

+ Inclusión de las incertibumbres

p.e. Métodos sintéticos y/o de bajo coste

LETTERS
https://doi.org/10.1038/s41558-017-0007-7
nature climate change

Increased rainfall volume from future convective storms in the US

Andreas F. Prein*, Changhai Liu, Kyoko Ikeda, Stanley B. Trier, Roy M. Rasmussen, Greg J. Holland and Martyn P. Clark

Mesoscale convective system (MCS)-organized convective storms with a size of ~100 km have increased in frequency and intensity in the USA over the past 35 years[1], causing fatalities and economic losses[2]. However, their poor representation in traditional climate models hampers the understanding of their change in the future[3]. Here, a North American-scale convection-permitting model which is able to realistically simulate MSCs[4] is used to investigate their change by the end-of-century under RCP8.5 (ref. [5]). A storm-tracking algorithm[6] indicates that intense summertime MCS frequency will more than triple in North America. Furthermore, the combined effect of a 15–40% increase in maximum precipitation rates and a significant spreading of regions impacted by heavy precipitation results in up to 80% increases in the total MCS precipitation volume, focussed in a 40 km radius around the storm centre. These typically neglected increases substantially raise future flood risk. Current investments in long-lived infrastructures, such as flood protection and water management systems, need to take these changes into account to improve climate-adaptation practices.

4 km

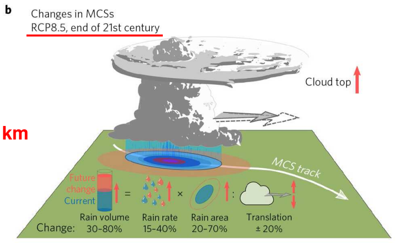


Fig. 1 | Schematic of Lagrangian tracking of MCS precipitation and future changes in MCSs. a, MCS hourly precipitation accumulations above 5 mm h^{-1} are identified and tracked over space and time (time corresponds to the vertical axis). **b**, Characteristics such as storm motion, rain rates or cloud top heights are identified for MCSs in the current and future climate. Highest increases are found for MCS precipitation volumes, which is positively related to increasing rain rates and rain areas and negatively to changes in storm motion (**b**).


MUCHAS GRACIAS!