

Seasonal hydro-ecological feedbacks during the 2018 drought in Europe

Ana Bastos et al.

2018 summer drought

SPIEGEL ONLINE SPIEGEL

Schätzungen aus den Ländern

Dürre richtet in Deutschland mehr als eine Milliarde Euro Schaden an

Die wochenlange Dürre hat in der deutschen Landwirtschaft bereits einen Schaden von mehr als einer Milliarde Euro angerichtet. Das haben erste Schätzungen der Länder ergeben.



LANDWIRTSCHAFT

Wegen Dürre Deutschland: Kartoffel-Ernte fällt auf historischen Tiefstand

Deutsche Wirtschafts Nachrichten | Veröffentlicht: 01.03.19 15:43 Uhr

Die Kartoffelernte ist im vergangenen Jahr eingebrochen.

Agriculture - Pêche

Calamité agricole reconnue pour 66 communes des Deux-Sèvres suite à la sécheresse de 2018

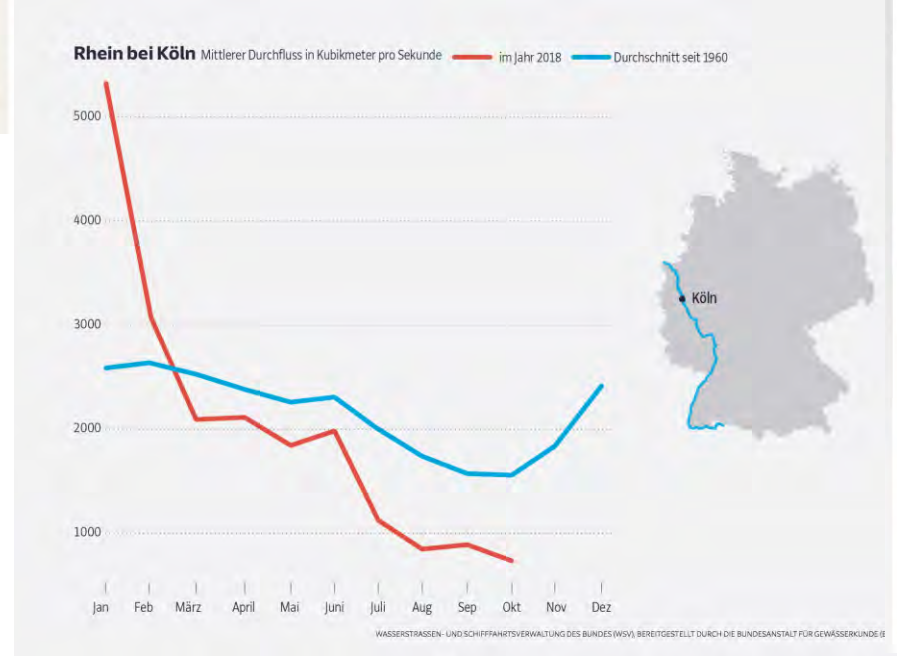
Mardi 19 février 2019 à 18:48
Par Noémie Guillotin, France Bleu Poitou

WELTKRIEGSMUNITION ALS GEFAHR

Dürre: Bombenfunde durch Niedrigwasser

Die Elbe und andere Flüsse in Deutschland führen so wenig Wasser wie seit Jahren nicht mehr. Die Folge: Munition aus dem Zweiten Weltkrieg wird freigelegt. Die Polizei warnt davor, die Gefahr zu unterschätzen.

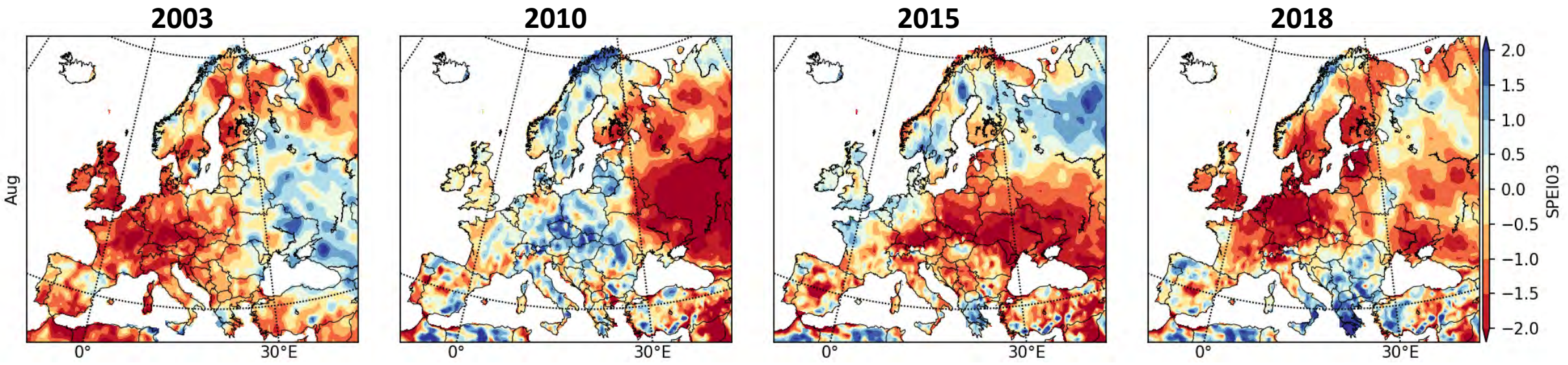
Le Comité national de gestion des risques en agriculture du 13 février 2019 a reconnu le caractère de calamité agricole suite à la sécheresse de 2018 pour 66 communes des Deux-Sèvres. Les agriculteurs vont pouvoir faire des demandes d'indemnisation à partir du 1er s.



66 communes des Deux-Sèvres sont reconnues en calamité agricole pour la sécheresse de 2018 © Maxppp -

2018 summer drought

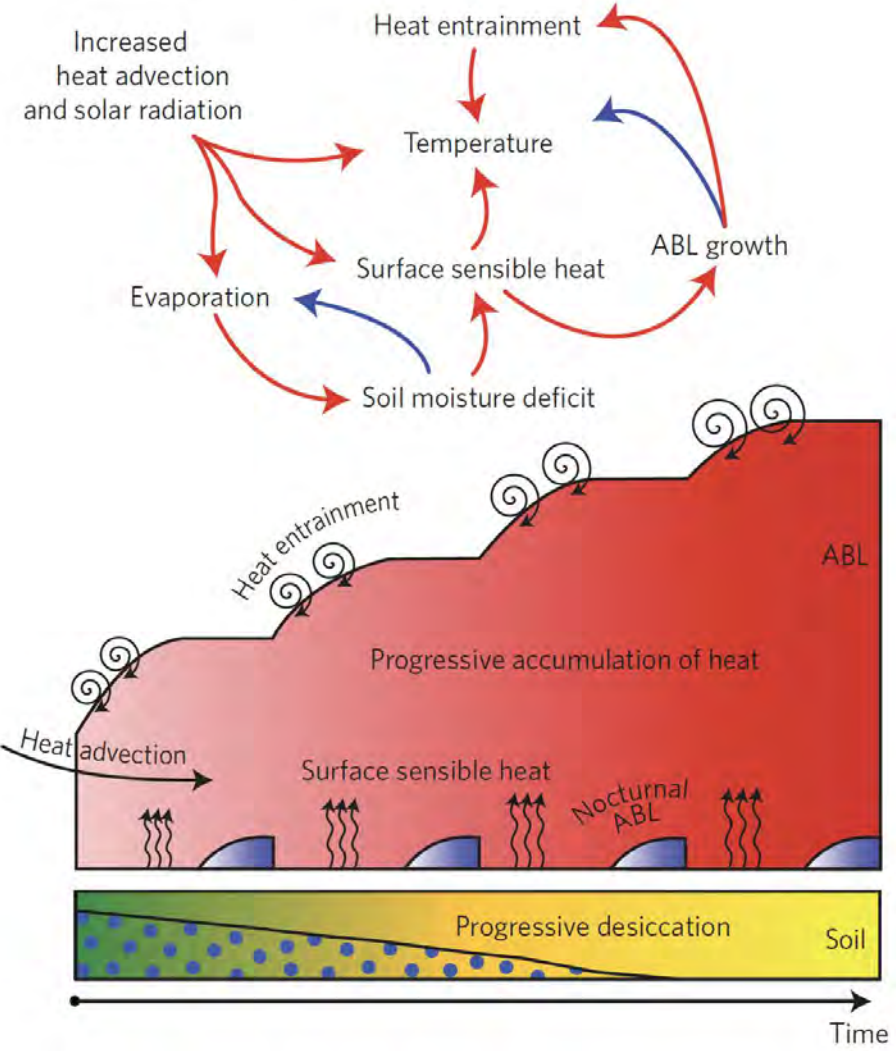
SPEI 03 values in August
(drought Jun-Aug)



Drought in summer 2018 ~ as severe as previous droughts/heatwaves

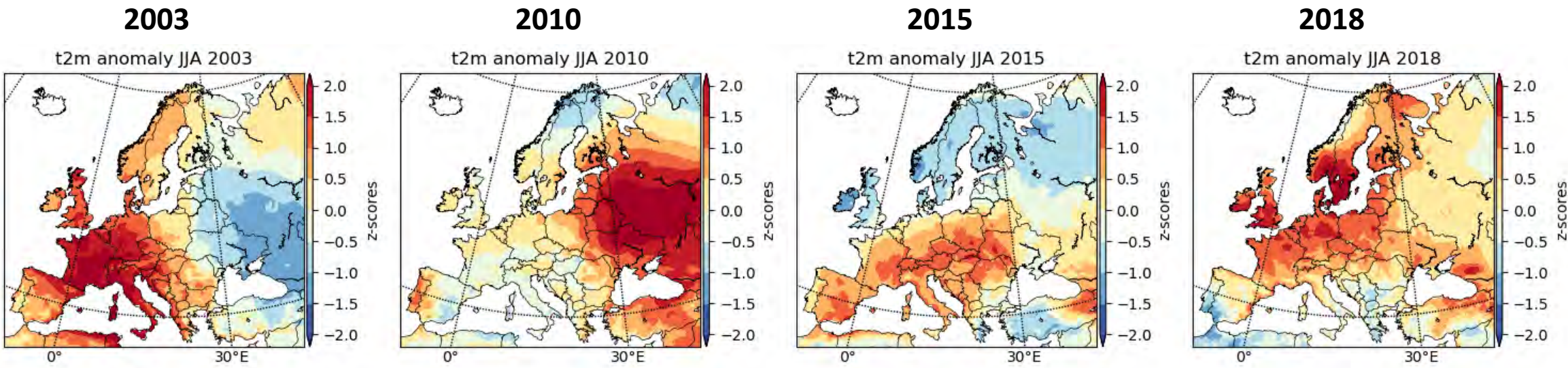
But centered more to the north than 2003 and 2015

Water-temperature feedbacks



Miralles et al. 2014

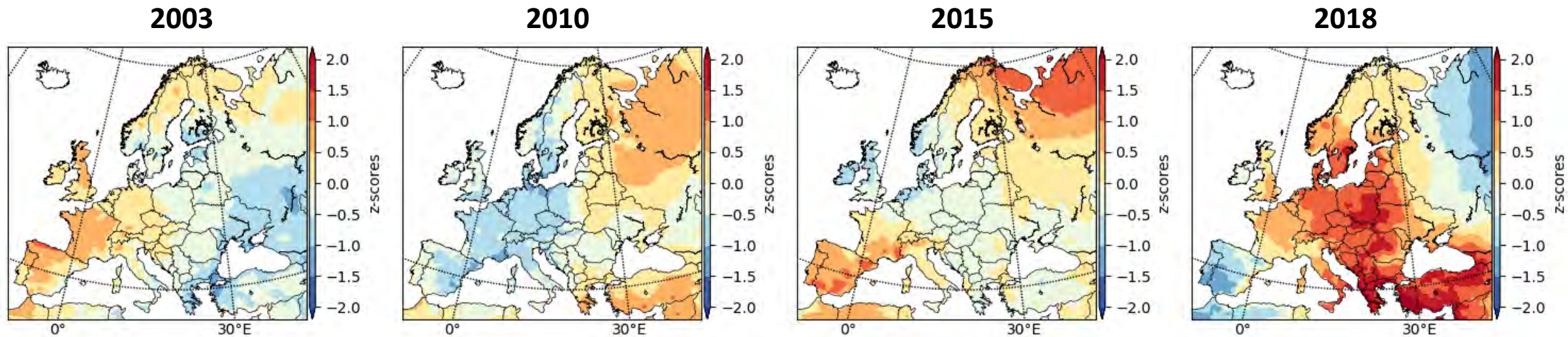
2018 summer heatwave



Summer heatwave in 2018 was not as widespread as 2003 and 2010 ...

2018 Spring heatwave

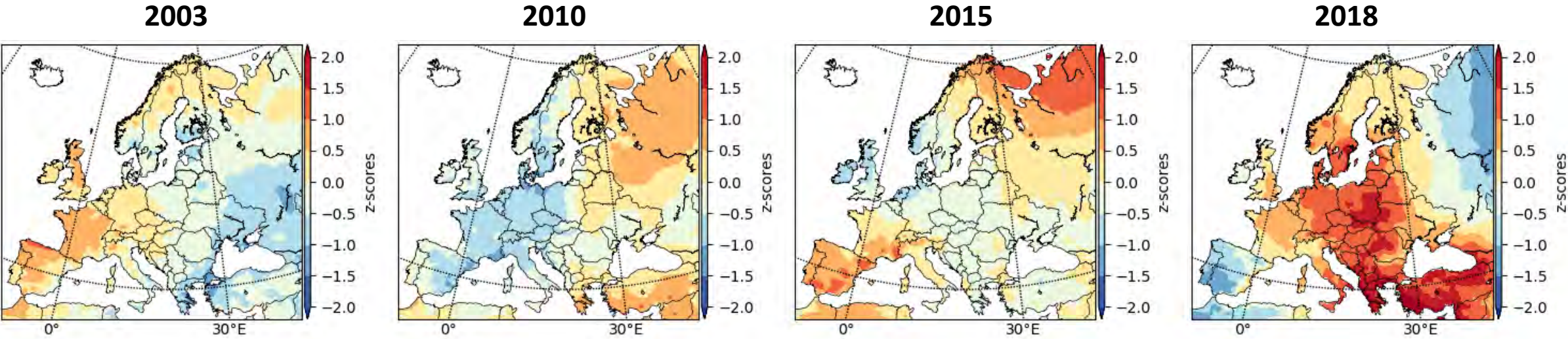
Spring temperature
anomalies



... however, extreme temperatures had already been registered since April

Spring heatwave in 2018

Spring temperature anomalies



... however, extreme temperatures had already been registered since April

Warming favours earlier vegetation growth in spring, which might also increase water depletion

- How did the ecosystems that seldom experience drought respond to the warming and drying anomalies in 2018?
- What is the relative effect of warming spring vs summer drought in the cumulative C-uptake over the growing season?
- Did enhanced vegetation growth in spring contribute to increase water depletion and to amplify the summer heatwave?

Workplan

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- Experiments:
 - S1 - Observed climate from 1979-2018 → to be compared w/ inversions or flux tower data
 - S2.1 – Replace spring 2018 with climatology, use 2018 summer → Summer heat and drought effect only
 - S2.2 – Replace summer 2018 with climatology, use 2018 spring → Contribution of vegetation response to extreme spring warming to summer drought
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- Outputs:
 - Key variables shall be delivered at **daily time-step** (normally monthly): GPP, Ra, Rh, Fire, NBP, LAI, evapotranspiration, latent and sensible heat fluxes

Progress

- Simulation protocol ready ✓
- ERA5 data from 1979-1999 became available late January. ✓
 - Downloaded
 - Pre-processed for model requirements
- Comparison of ERA5 with other common model forcings ✓
- Data and protocol sent to other modelling teams (**9 models** confirmed!) ✓
- ... Outputs expected @ EGU

Thanks!

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