

# Seasonal hydro-ecological feedbacks during the 2018 drought in Europe

Ana Bastos et al.

# 2018 summer drought

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.



Deutschland / Deutschland / Deutschland / Kartoffel-Ernte fällt auf historischen Tiefstand

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



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.

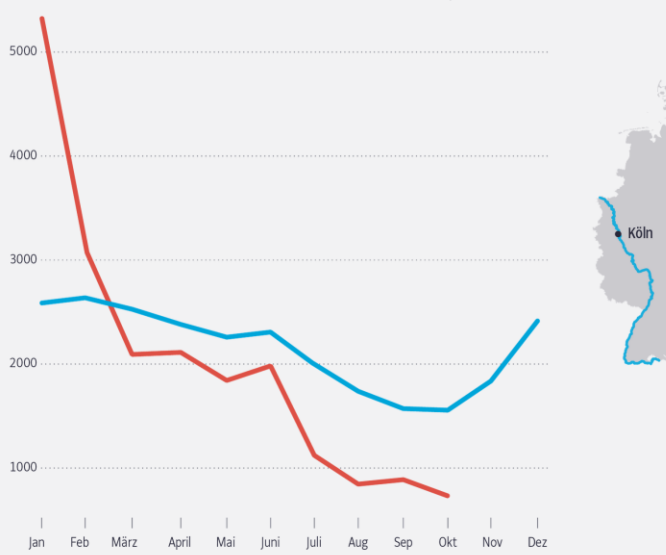
WELTKRIEGSMUNITION ALS GEFAHR  
**Dürre: Bombenfunde durch Niedrigwasser**

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.



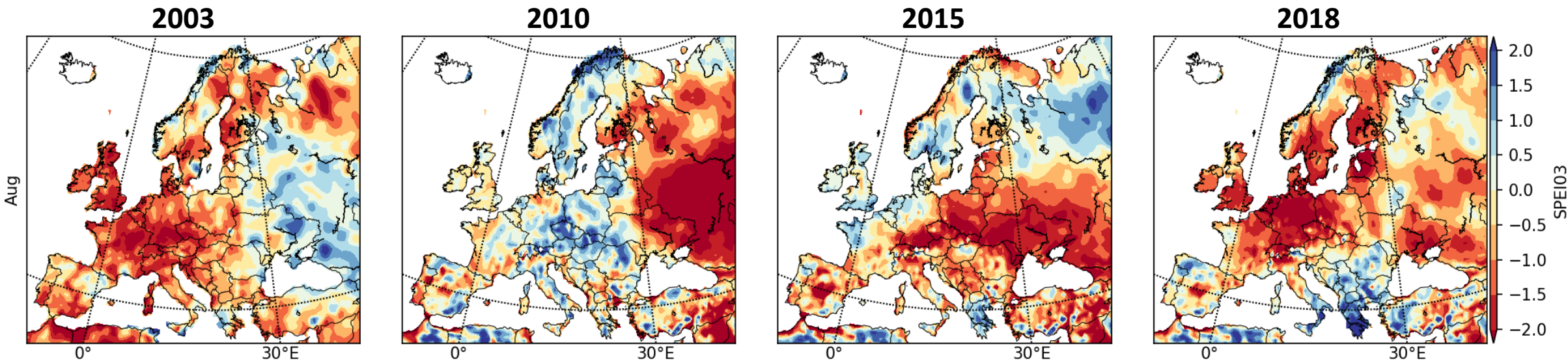
66 communes des Deux-Sèvres sont reconnues en calamité agricole pour la sécheresse de 2018 © Maxppp -

Rhein bei Köln Mittlerer Durchfluss in Kubikmeter pro Sekunde



# 2018 summer drought

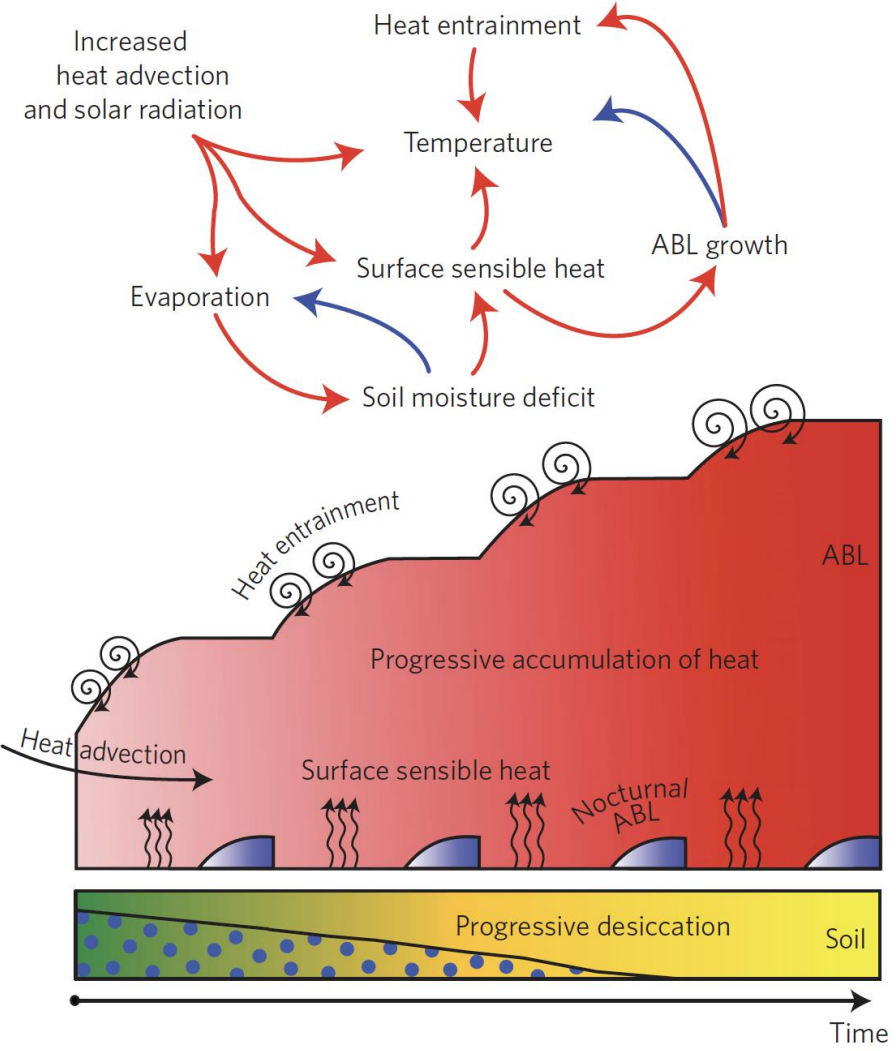
SPEI 03 values in August  
(drought Jun-Aug)



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

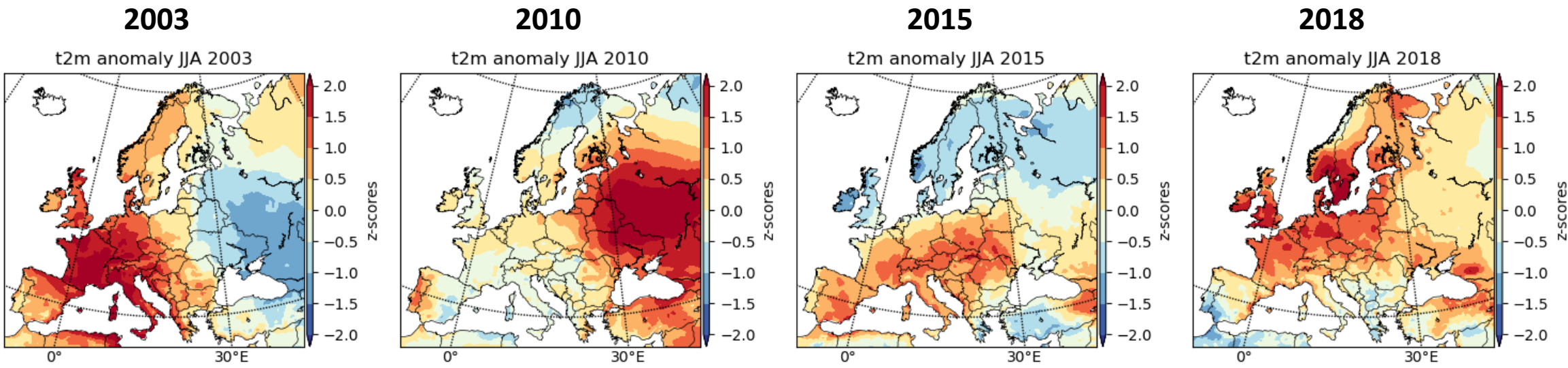
**But centered more to the north than 2003 and 2015**

# Water-temperature feedbacks



Miralles et al. 2014

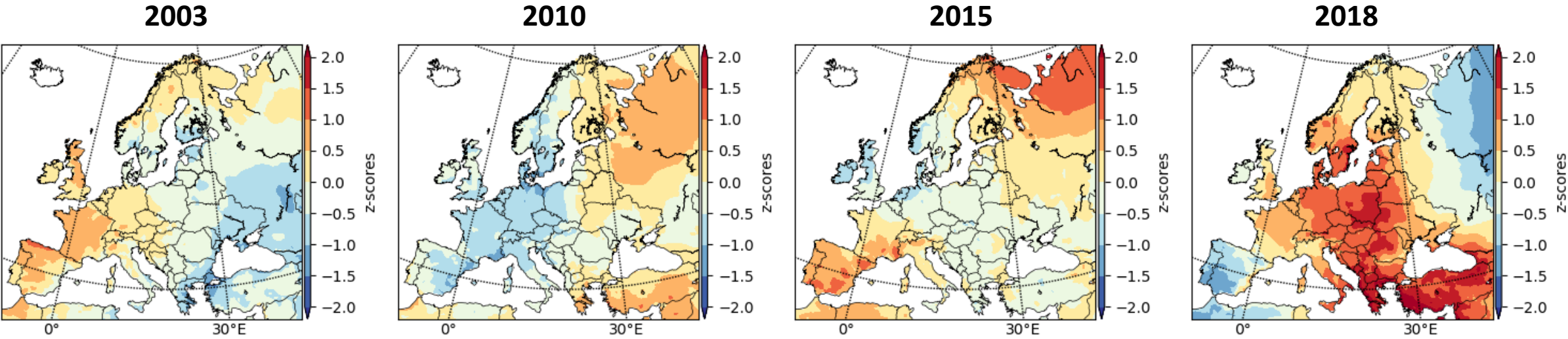
# 2018 summer heatwave



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

# 2018 Spring heatwave

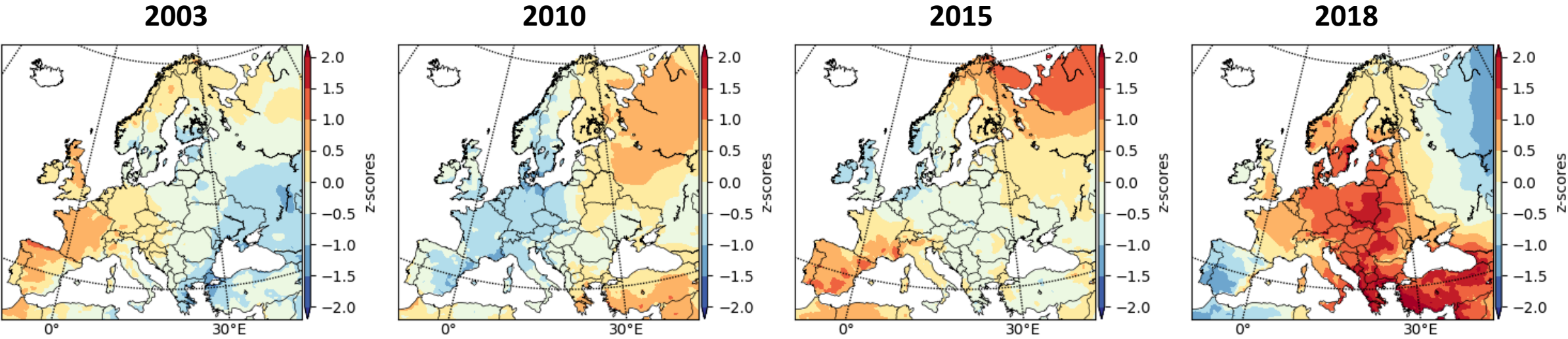
Spring temperature anomalies



**... 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?



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  - 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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