

THE STRENGTH OF A COMMON GOAL





ECMWF Data Centre Industry Day

Overview of ECMWF

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8.835 weather related disasters

1.94 million deaths

\$2.4 trillion economic losses


European co-operation at its best: pooling resources



A world map with a light gray background. The continent of Europe is highlighted in a dark blue color. The rest of the world's continents are shown in a light gray tone.

ECMWF's role is to address the critical and most difficult research problems in medium-range NWP that no one country could tackle on its own

PLAYING A UNIQUE ROLE

- 
- A world map with a light gray background. The continent of Europe is highlighted in a dark blue color. The rest of the world's continents are shown in a light gray color.
- 34 member and co-operating states
 - 340 staff +
 - 30 countries
 - 1 – soon to be 2 locations
 - Partnerships around the world ...

PLAYING A UNIQUE ROLE



GLOBAL COLLABORATION

European co-operation at its best: **deliverables**

- Global numerical weather forecasts
- Supercomputing & data archiving
- Education & training programme

- EU activities: *Operating the Copernicus Climate and Atmosphere Services, and contributing EFAS and FIRE to the Copernicus Emergency Management Service*



Ensemble prediction: an overview



Ensemble prediction: an overview



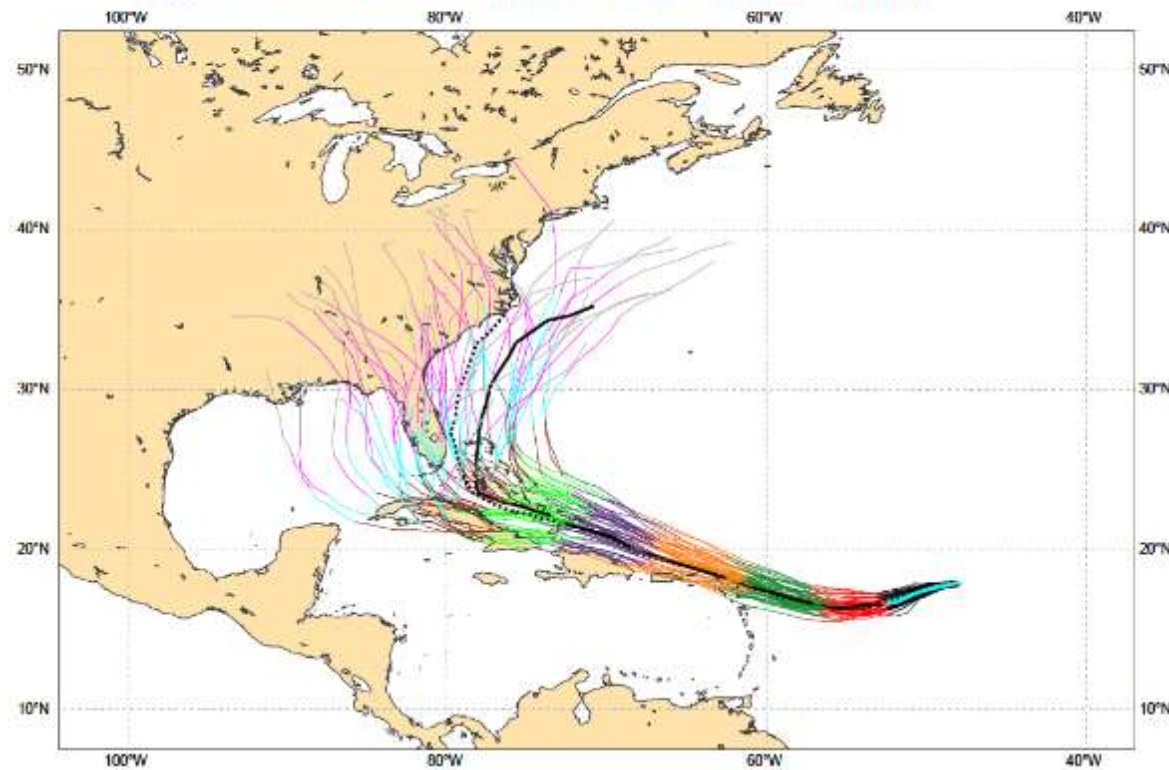
25 Years of ensemble prediction

Date 20170903 12 UTC @ECMWF

Individual trajectories for **IRMA** during the next 240 hours

tracks: **thick solid**=HRES; **thick dot**=CTRL; **thin solid**=EPS members [coloured]

0-24h 24-48h 48-72h 72-96h 96-120h 120-144h 144-168h 168-192h 192-216h 216-240h

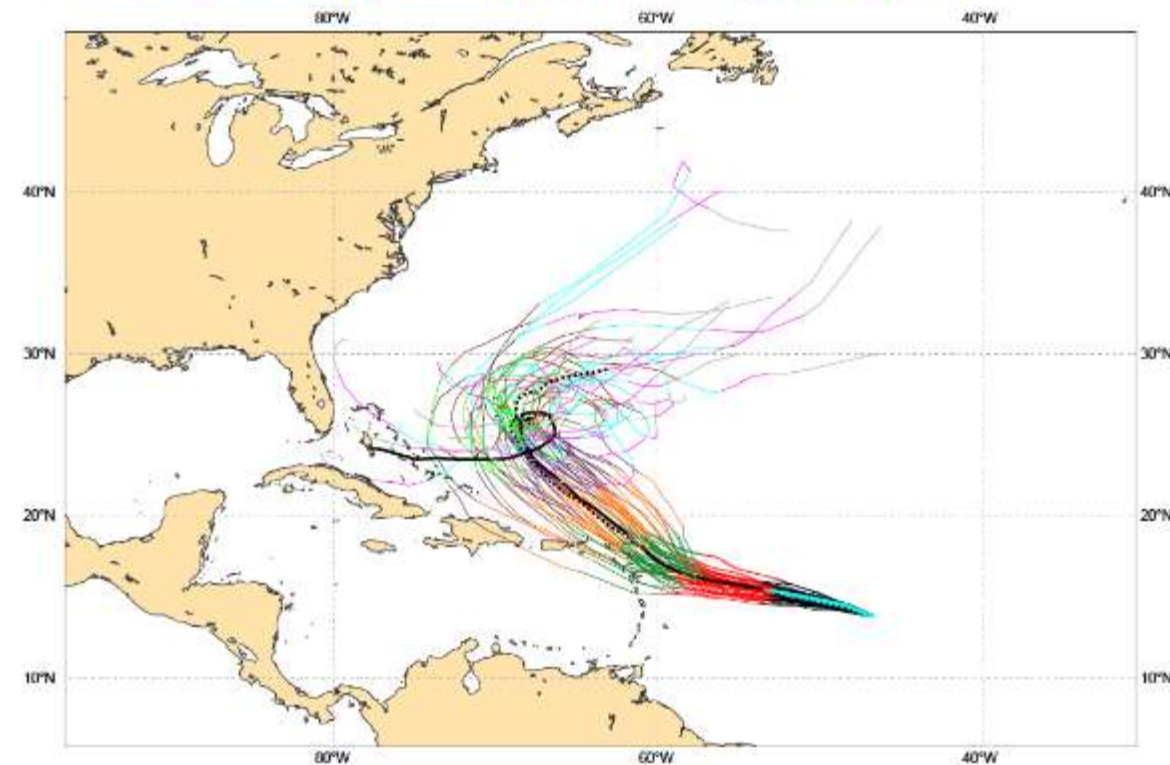


Date 20170907 00 UTC @ECMWF

Individual trajectories for **JOSE** during the next 240 hours

tracks: **thick solid**=HRES; **thick dot**=CTRL; **thin solid**=EPS members [coloured]

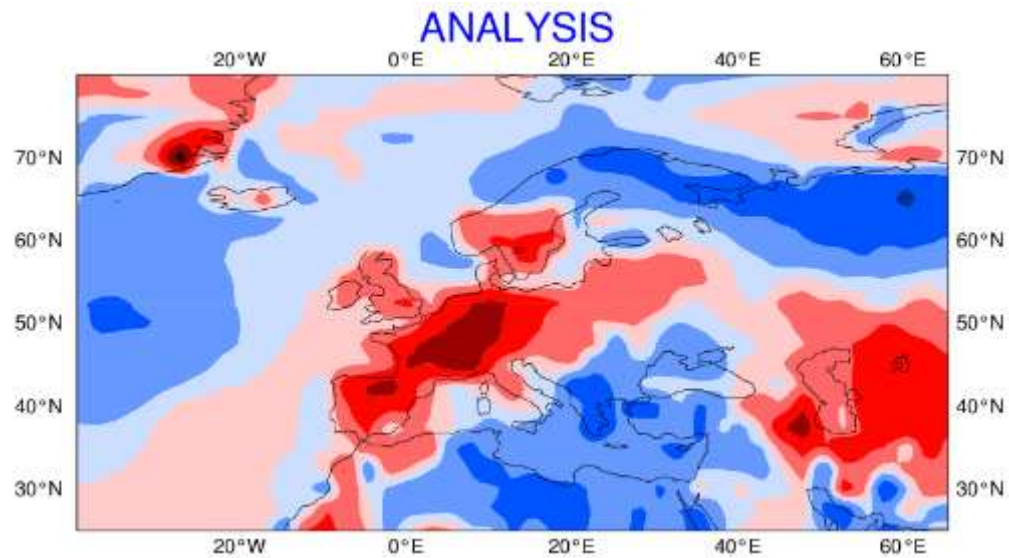
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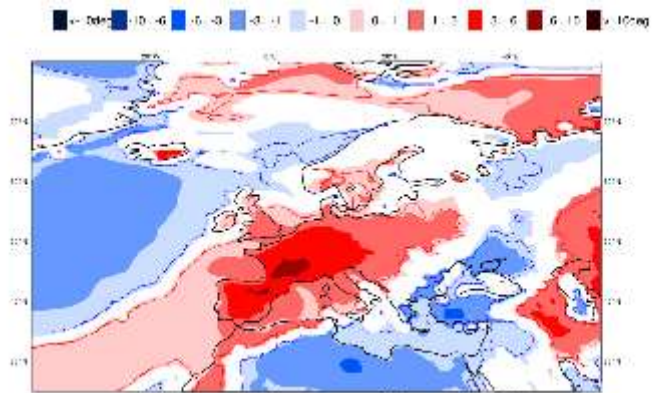
Monthly forecast:

Forecasting large scale patterns

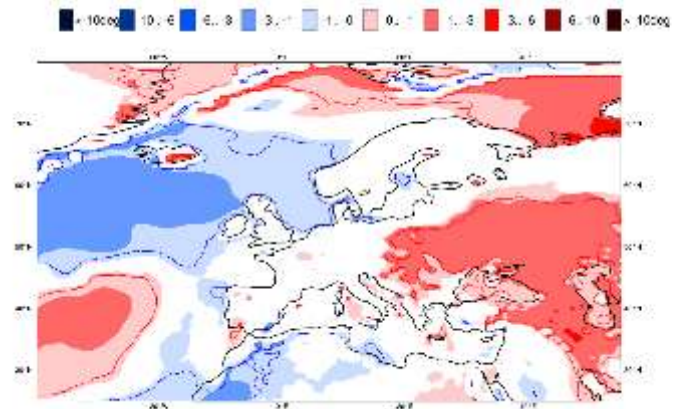
European heat wave 29 June – 5 July 2015



Forecast week 1.5

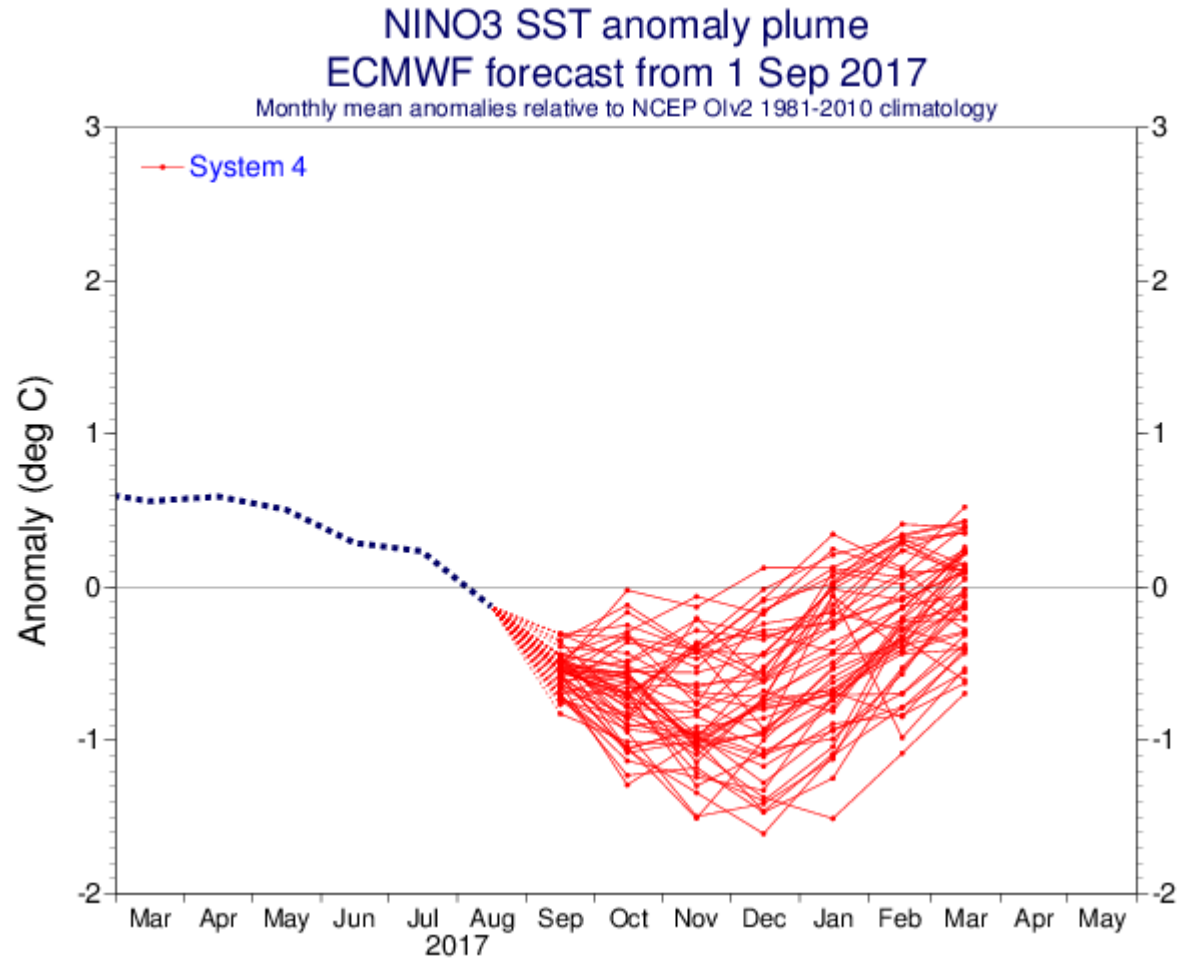


Forecast week 2.5



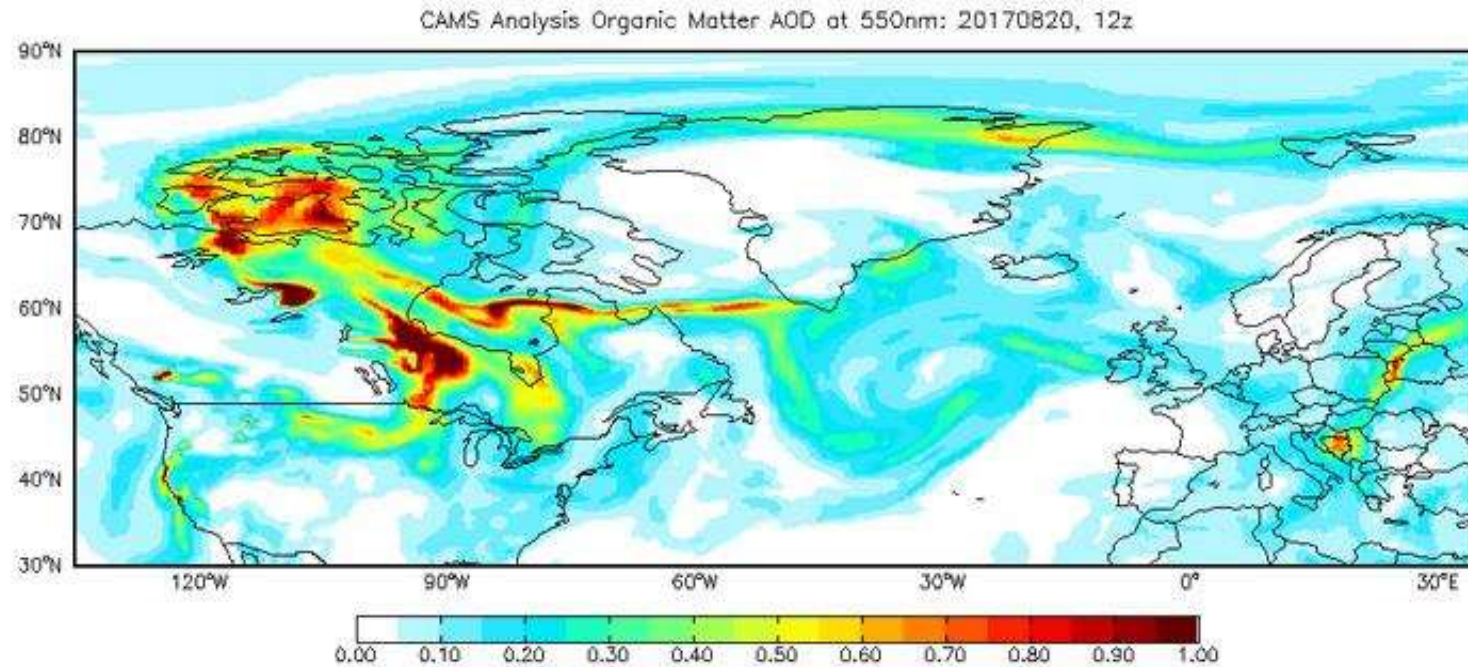
Seasonal: El Nino

Supporting planning activities



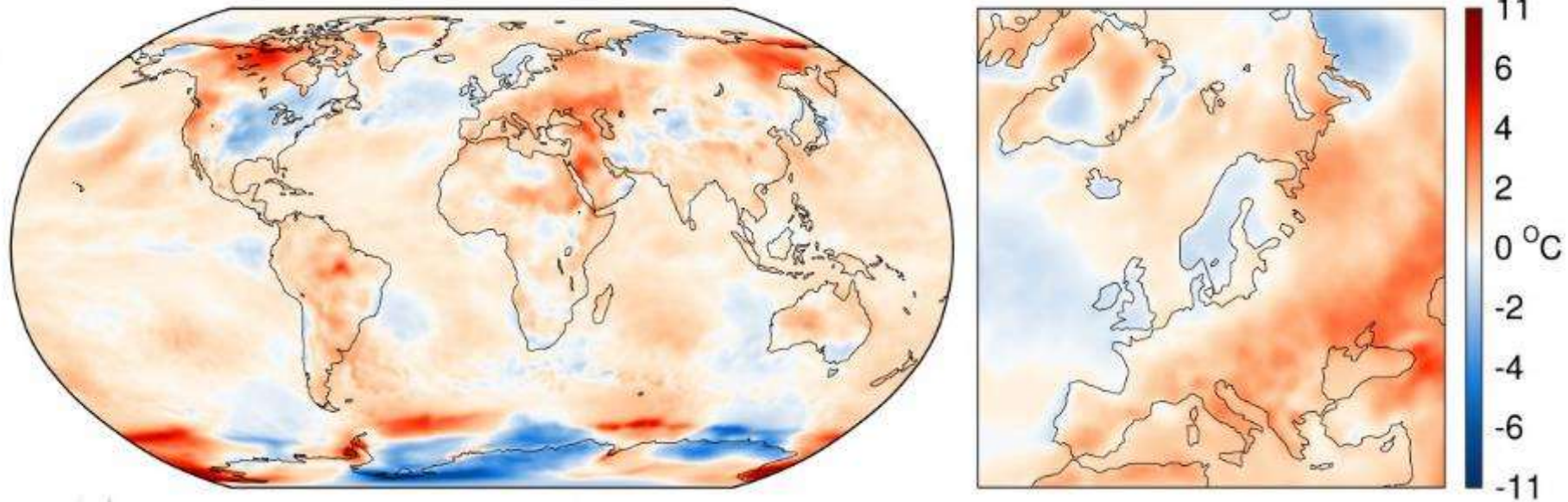
ECMWF working with the EU to Monitor Air Quality

Operating the Copernicus Atmosphere Monitoring Service



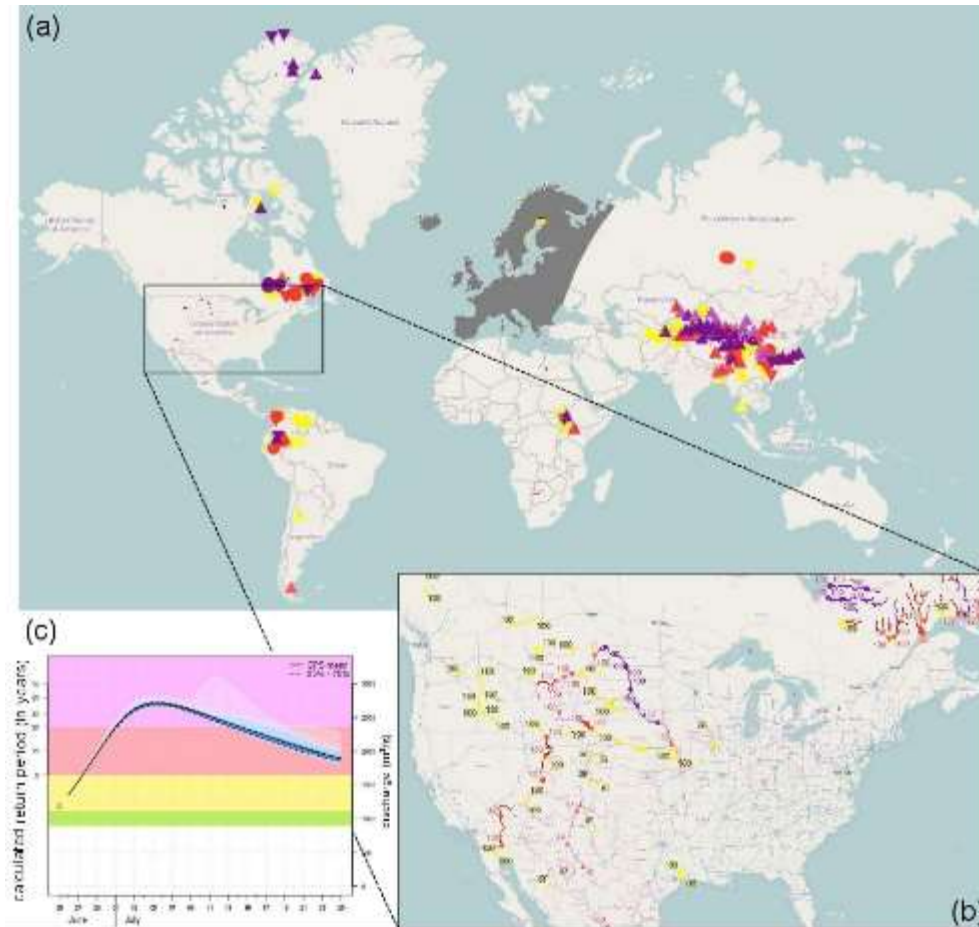
ECMWF working with the EU to monitor climate change

Operating the Copernicus Climate Change Service

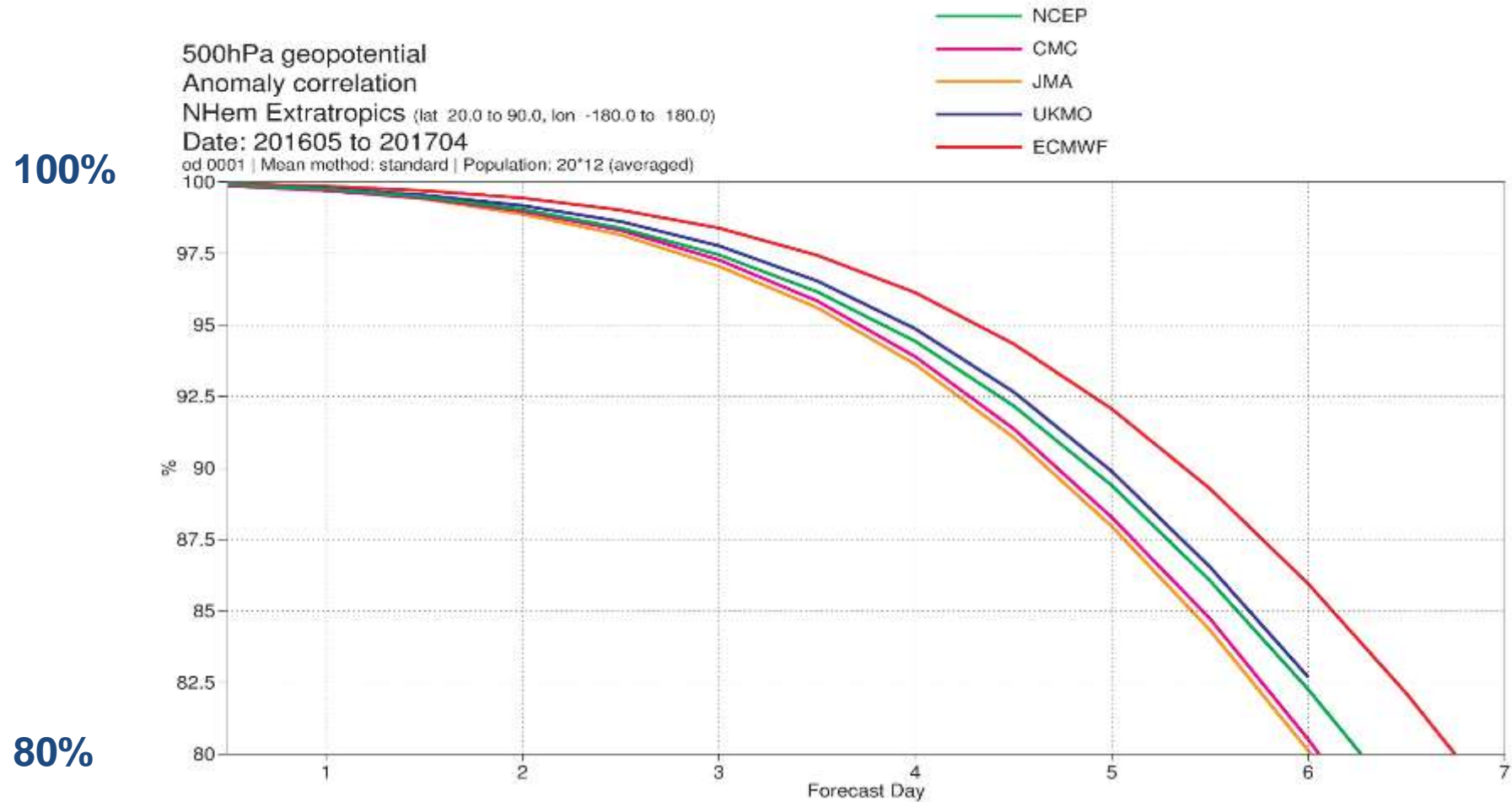


ECMWF working with the EU to forecast flooding

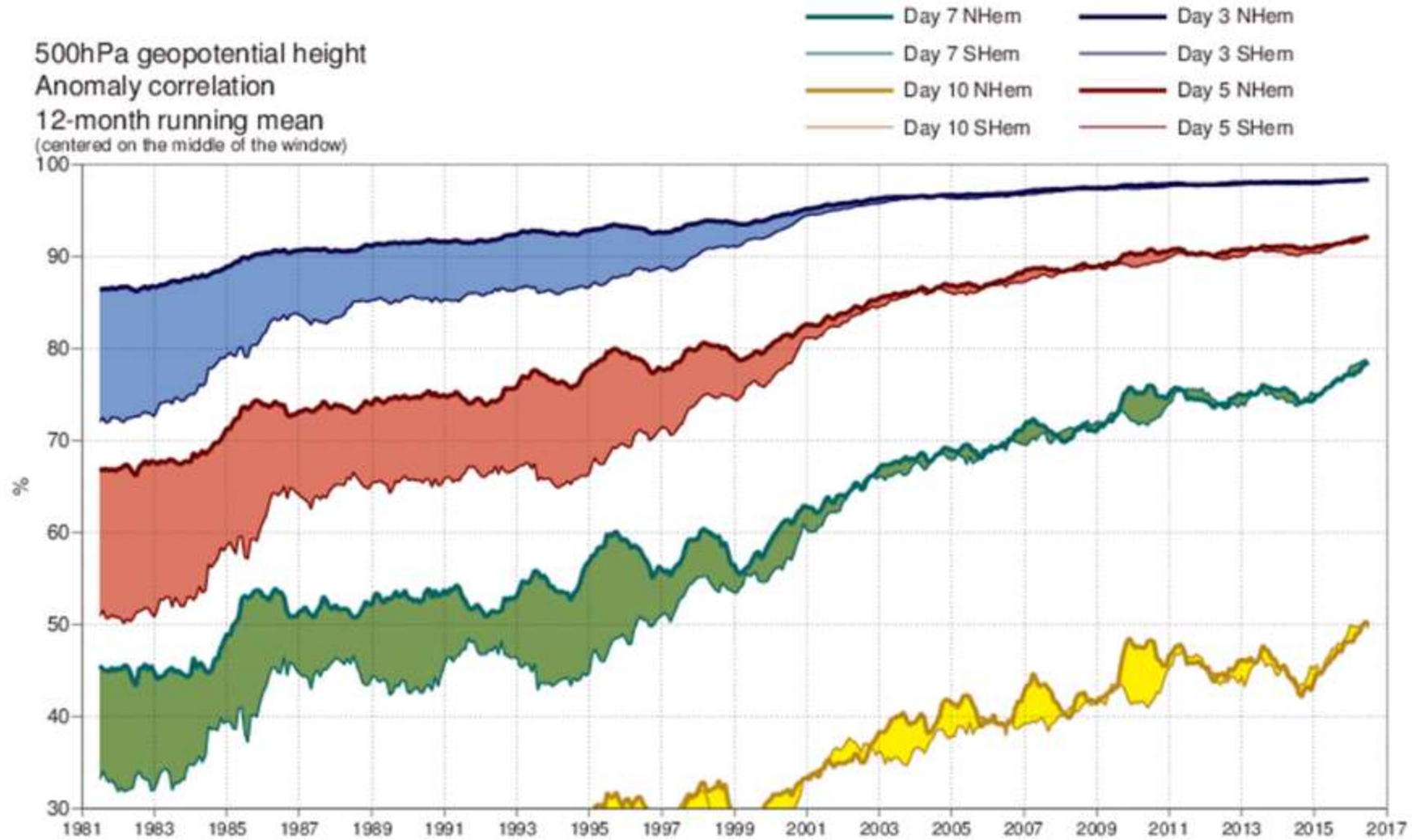
Contribution to Copernicus Emergency Management Service



Snapshot of today: correlation above 80% up to 7 days

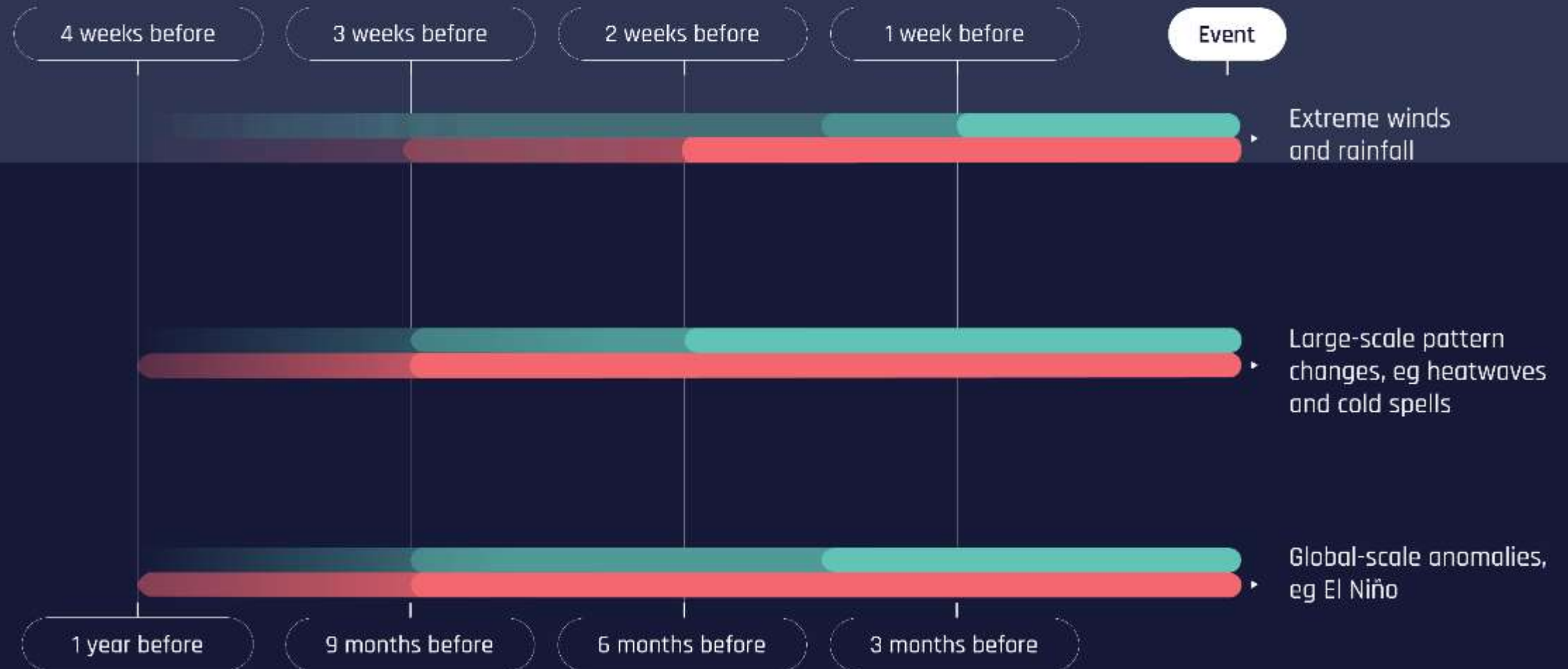


The quality of our forecasts

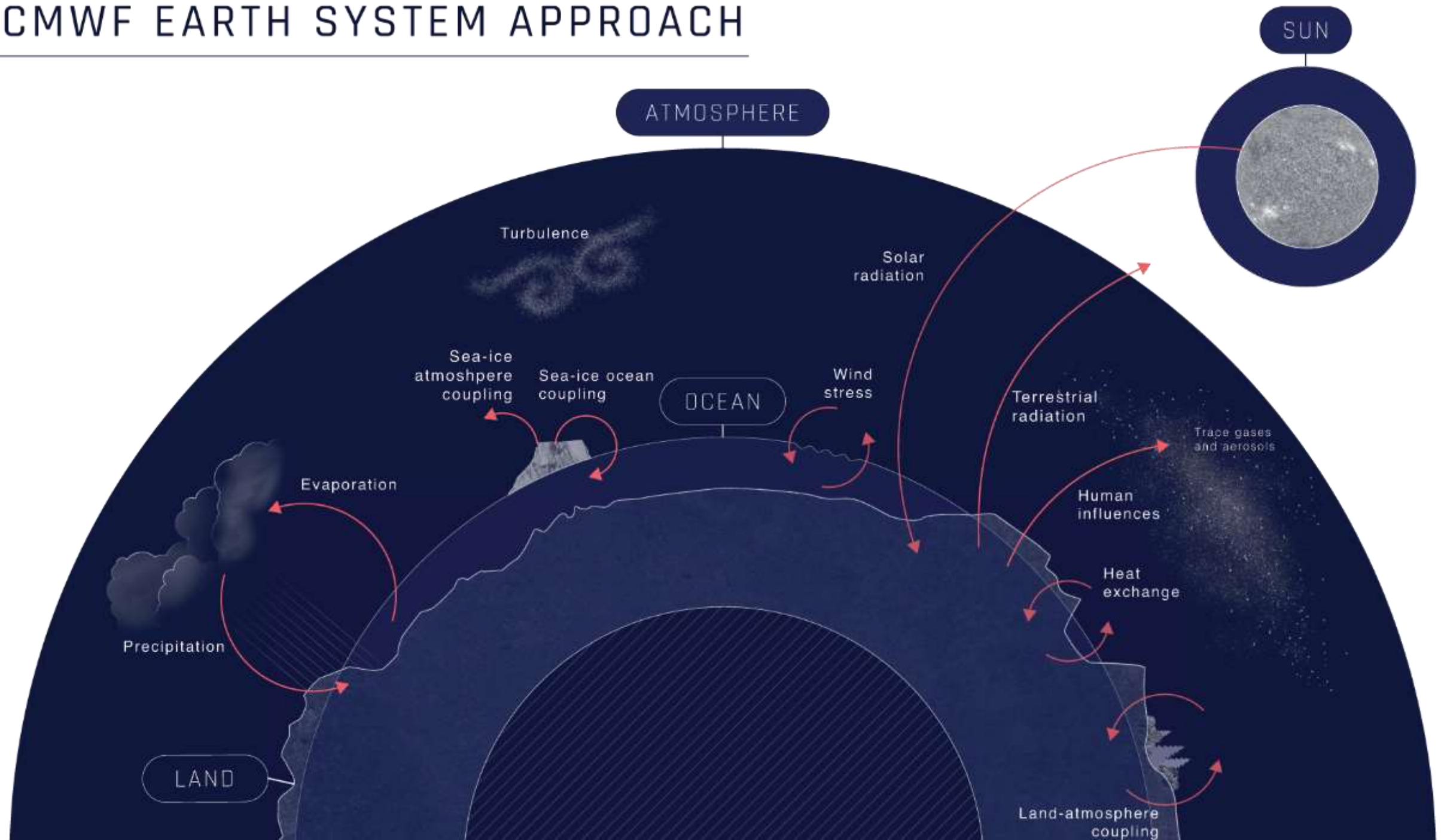


THINKING AHEAD

How far in advance can we predict extreme weather events, now and in the future?

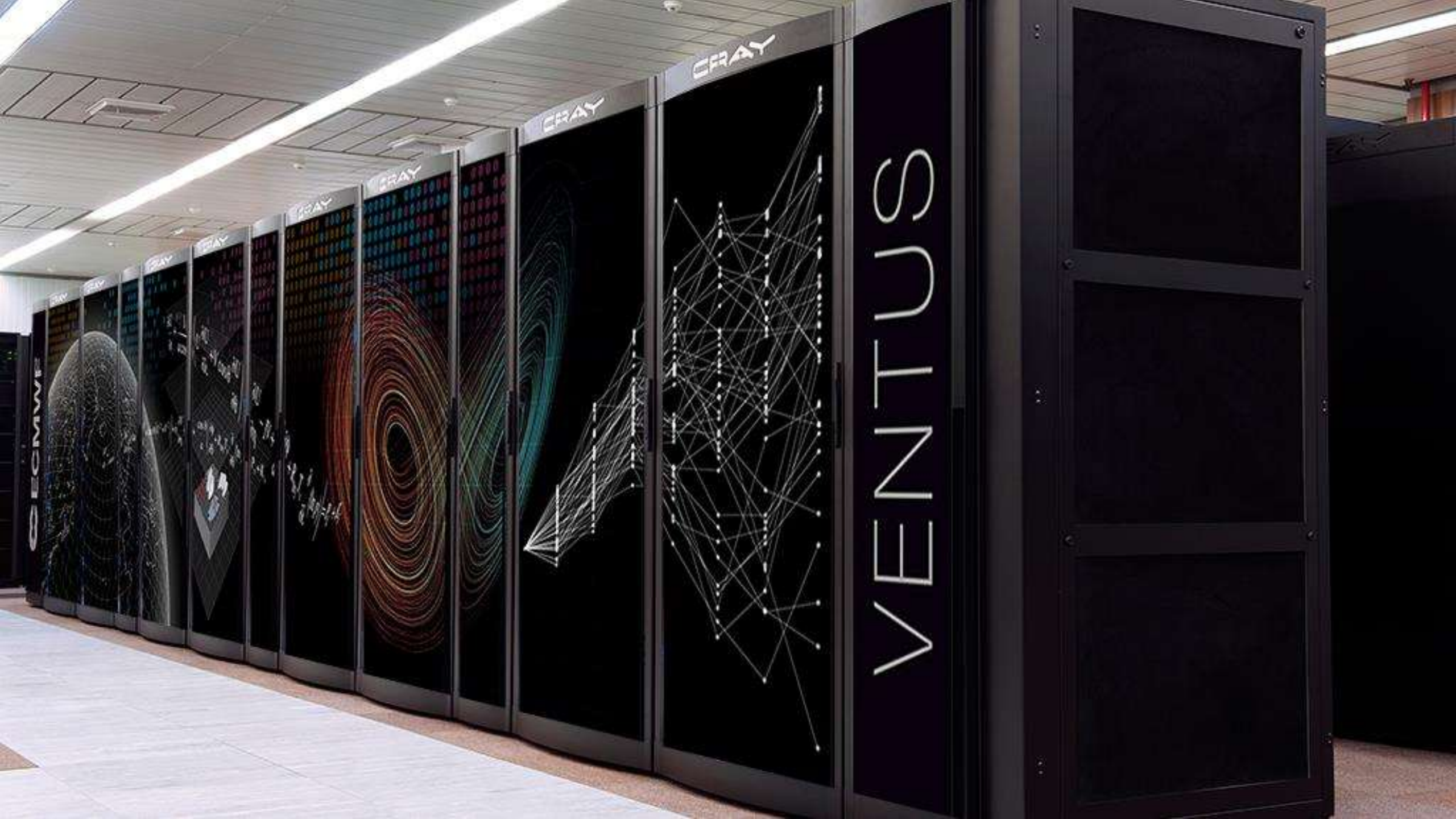


ECMWF EARTH SYSTEM APPROACH



INCREASED HORIZONTAL RESOLUTION OF ENSEMBLE FORECASTING





CEMWE

CRAY

CRAY

CRAY

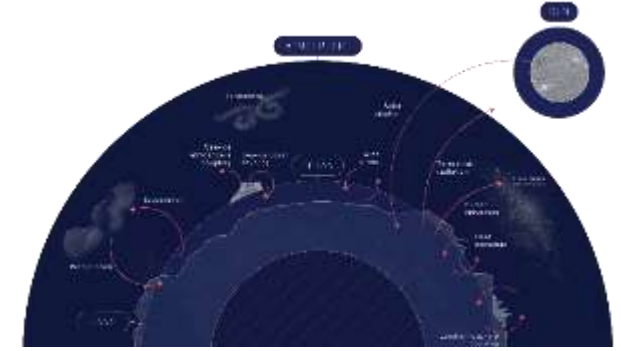
CRAY

CRAY

CRAY

VENTTUS

Scalability: a challenge for NWP

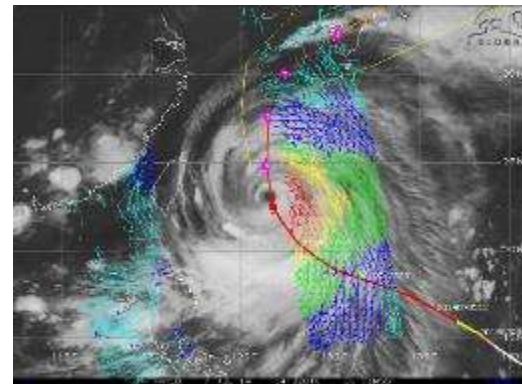


		OBSERVATIONS	MODELS
TODAY	<u>volume</u>	40 million = 4×10^7	10 million grid points 100 levels 10 prognostic variables = 1×10^{10}
	<u>type</u>	98% from 60 different satellite instruments	physical parameters of atmosphere, waves, ocean
TOMORROW	<u>volume</u>	100-200 million = $1-2 \times 10^8$	500 million grid points 200 levels 100 prognostic variables = 1×10^{13}
	<u>type</u>	98% from 80 different satellite instruments	physical and chemical parameters of atmosphere, waves, ocean, ice, vegetation
		FACTOR 5	FACTOR 1000

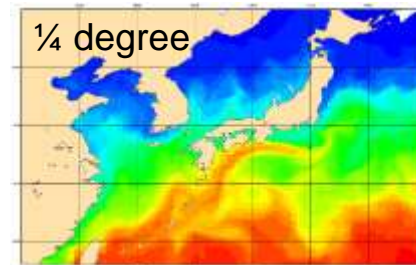
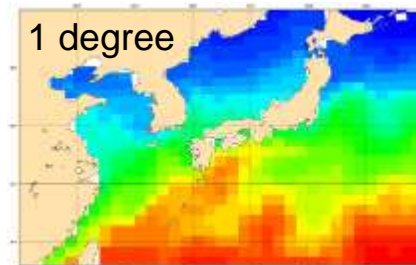
Future developments and challenges



Assimilate more observations in the coupled data assimilation system



Better assimilate observations at the air-sea interface



Use higher resolution Earth system model

Italy to host **ECMWF** new data centre in 2020



ECMWF – An International Organisation

- International organisation – established by Treaty
- 22 member states – 12 Co-operating States
- Hosted by Italy – Agreement ratified by Italian Parliament in December 2017
- Privileges and Immunities:
 - Exempt from Taxes
 - Premises, documents and data inviolable
 - Not subject to jurisdiction of national Courts – Arbitration Clause



THE STRENGTH OF A COMMON GOAL

