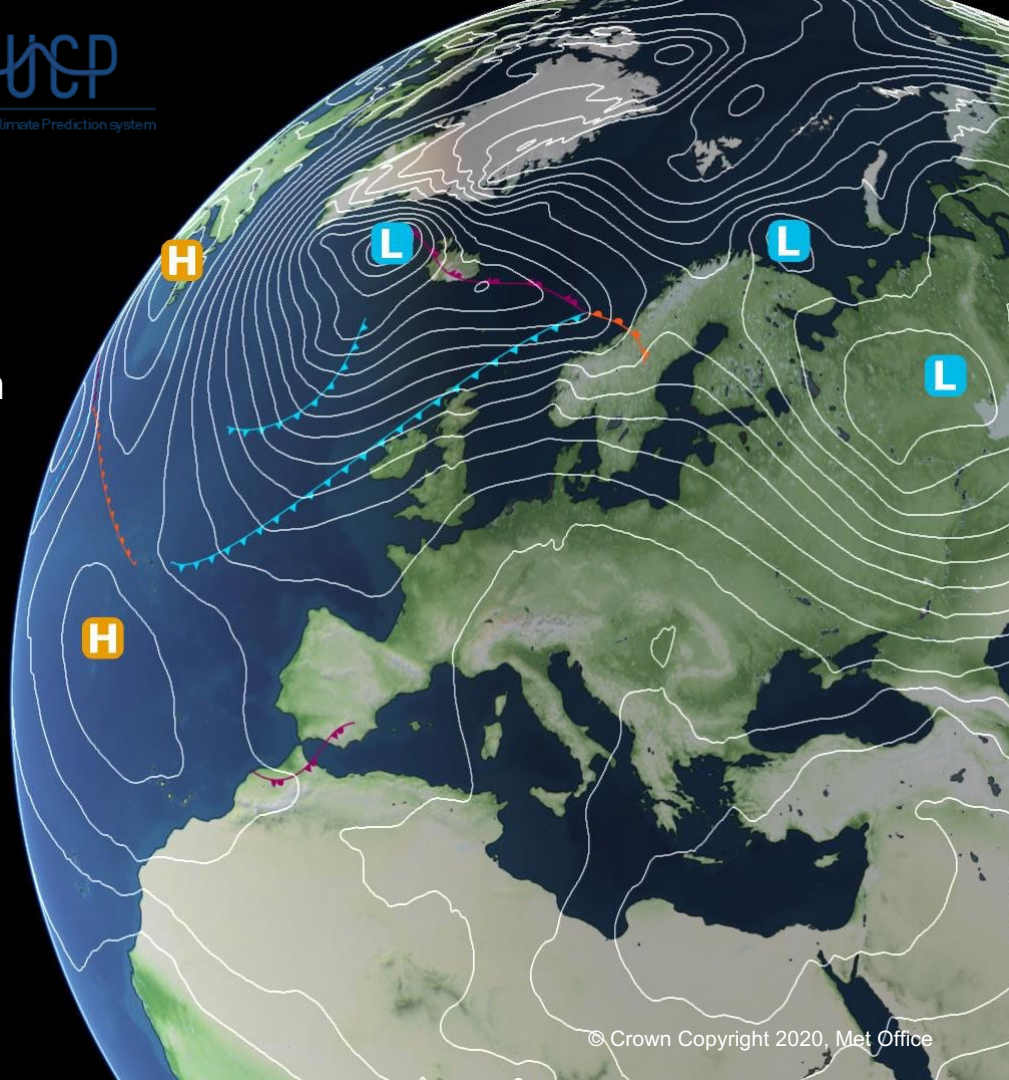


# WMO

Lead Centre for Annual to Decadal Prediction  
**Update**

Leon Hermanson, Met Office, UK



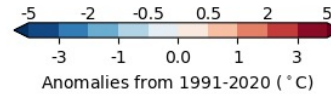
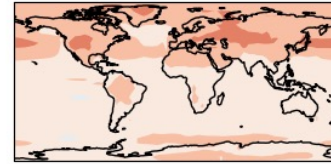
# WMO Lead Centre for Annual to Decadal Climate Prediction

- Started as an informal exchange of decadal predictions among modelling centres around the world in 2010 (Smith et al. 2013) to produce a large multi-model ensemble of real-time decadal forecasts.
- Today: four Global Producing Centres (BSC, CCCMA, DWD, Met Office) supported by Contributing Centres
- Some of the responsibilities of the Lead Centre are:
  - Prepare forecast fields annually from the data collected
  - Prepare verification statistics of the multi-model and individual models
  - Make available up-to-date information on the decadal prediction systems
  - Create Global Annual to Decadal Climate Update (consensus forecast)
- This is all available at **[www.wmolc-adcp.org](http://www.wmolc-adcp.org)**

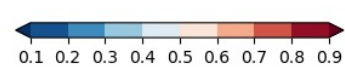
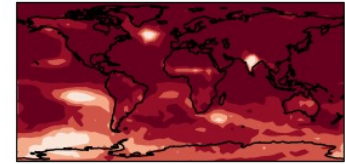


- Issued annually in May by the WMO Lead Centre for Annual to Decadal Climate Prediction
- Last update had contributions from 11 centres: BCCR, BSC, CCCMA, CMCC, DWD, Met Office, GFDL, CMA/LASG, MIROC, MRI, NRL
- Headline results from last year:
  - 48% chance of exceeding 1.5°C global temperature in next 5 years
  - The chance of at least one year between 2022 and 2026 exceeding the warmest year on record, 2016, is 93%
- New: forecast maps and indices for seasons
- Press releases from WMO and Met Office had phenomenal pickup by nearly all major news outlets with millions of subscribers and in multiple languages
- Hermanson et al, 2022, BAMS

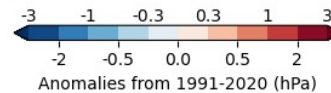
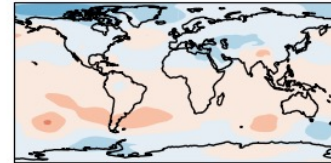
Ensemble mean forecast MJJAS 2022-2026  
near-surface temperature



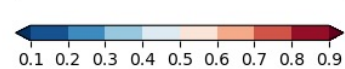
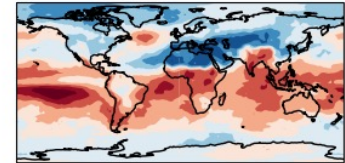
Probability of above average  
near-surface temperature



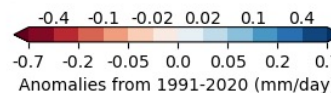
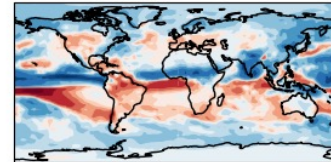
sea-level pressure



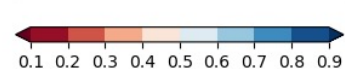
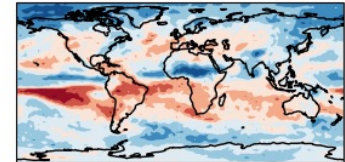
sea-level pressure



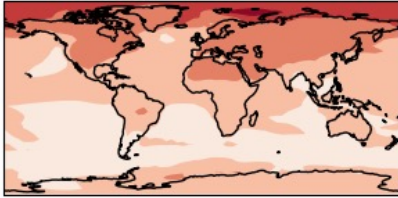
precipitation



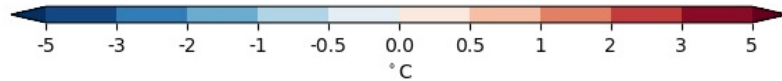
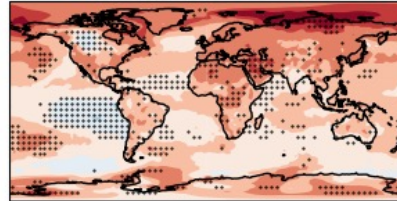
precipitation



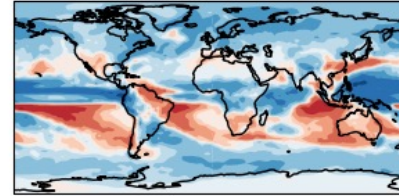
Ensemble mean forecast  
near-surface temperature



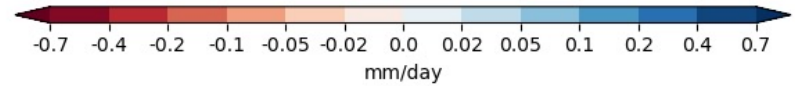
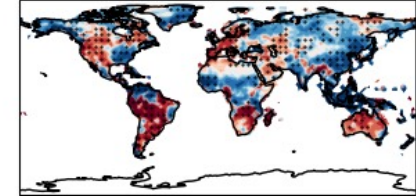
Observations 2018-2022  
near-surface temperature



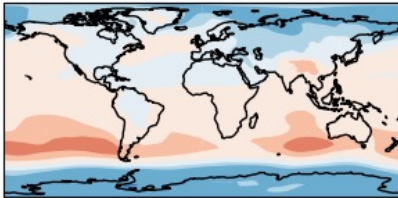
precipitation



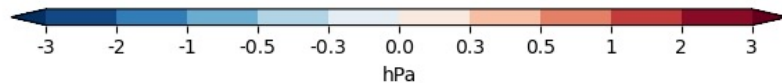
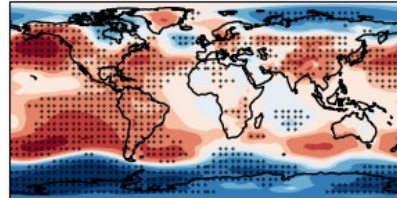
precipitation



sea-level pressure



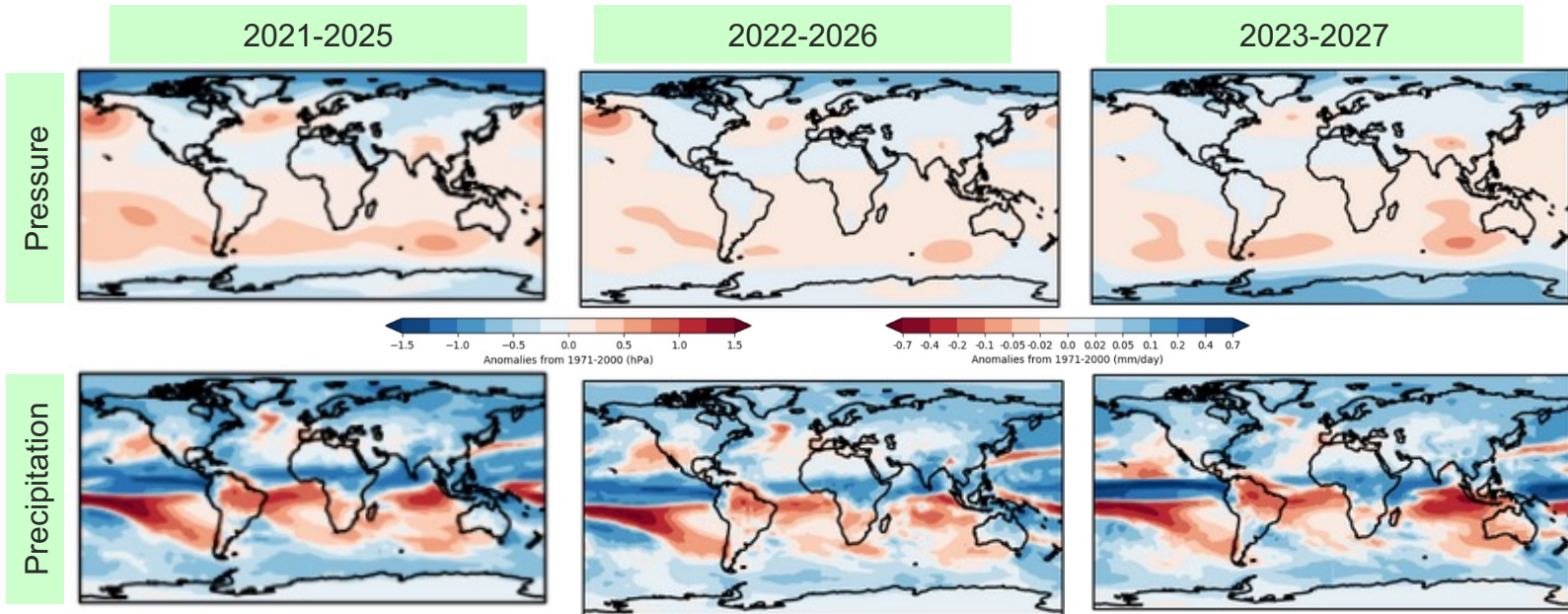
sea-level pressure



- Stippling shows where observations outside 90% range of forecast ensemble
- Temperature captured well, some anomalies not large enough in Africa and Asia
- Extended La Niña not predicted
- Sea-level pressure anomalies right sign, but anomalies too weak
- Wet in Sahel and dry in Australia captured, but anomalies weak
- Precipitation in South America of opposite sign



# The case for an attribution system

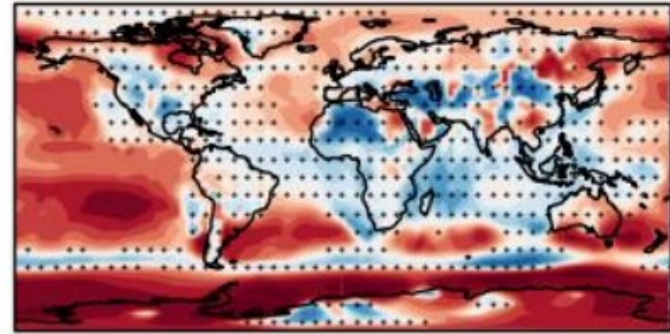


- Consistent forecasts for the coming 5 years
- What drives the signals?
- How much confidence do we have?

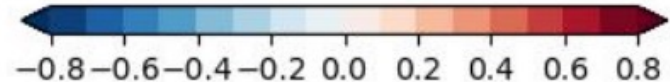
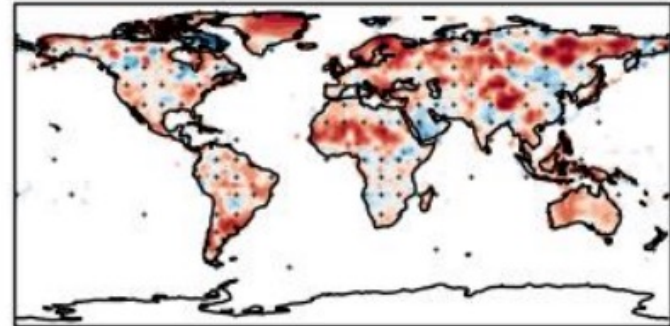
# The case for an attribution system: Historical skill

- Skill does not reflect regions with common signals
- Hindcast skill on average does not necessarily mean forecast skill
- Lack of hindcast skill does not necessarily mean lack of forecast skill
- Move beyond average historical skill
  - Windows of opportunity
- Need to understand the drivers
  - Lighthouse Activity: Explaining & Predicting Earth System Change (EPESC)
  - [Large Ensemble Single Forcing MIP](#)

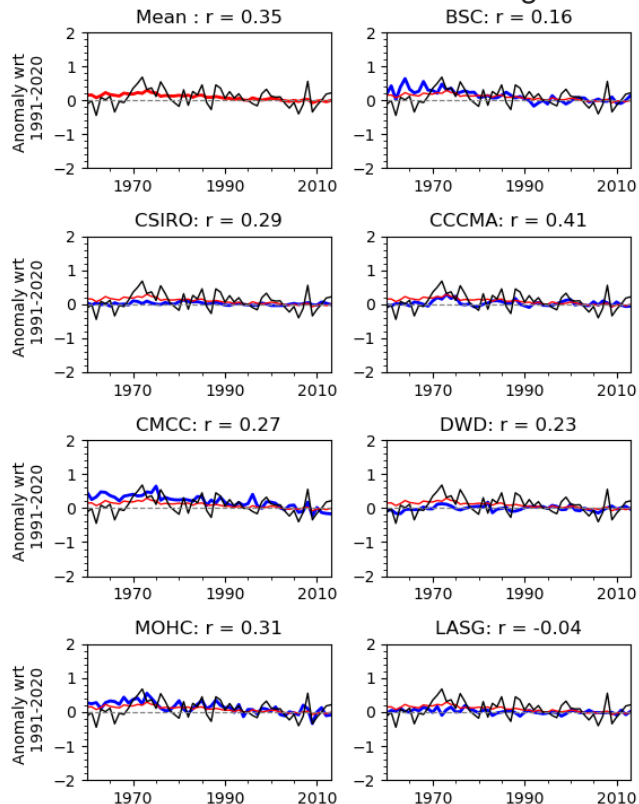
Pearson correlation  
sea-level pressure



Pearson correlation  
precipitation

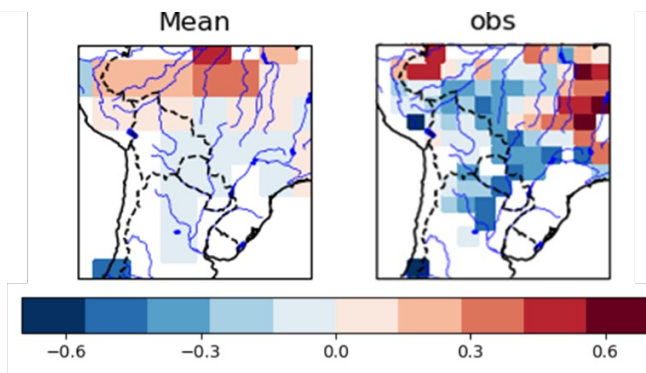


## South American Monsoon region

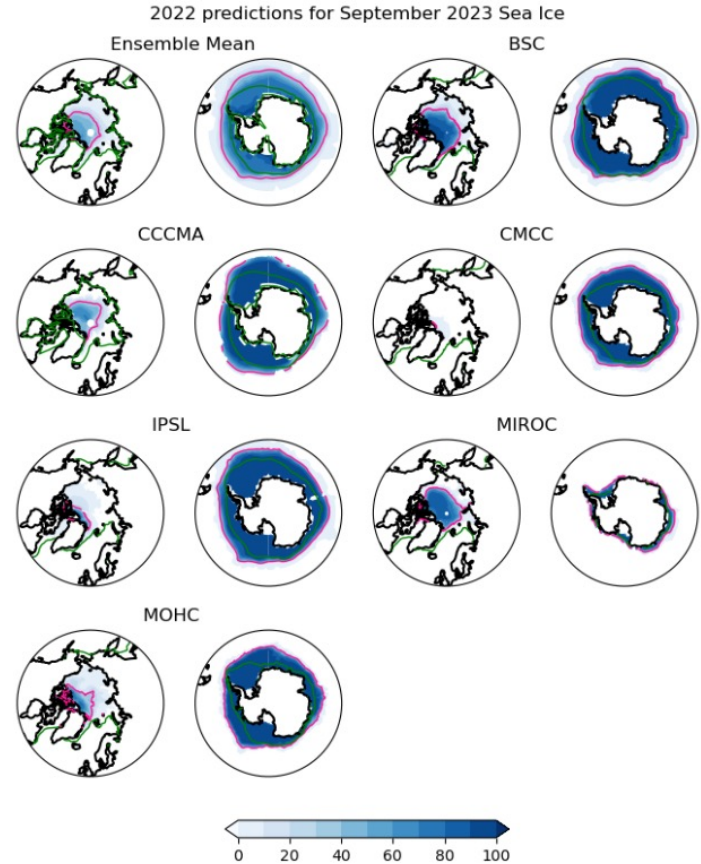


- A frequent request, especially for monsoons
- Dunstone et al, ERL (2020) showed it was possible
- Forecasts for each region using the relevant season
- Links up with Regional Climate Outlook Forums
- Featured on website and in the next Climate Update

## South American Monsoon region



- We have asked for this variable for many years
- Sea-ice edge and concentration
- Sea-ice extent index





# WMO Lead Centre for Annual to Decadal Climate Prediction

- Now in 13<sup>th</sup> year of producing a multi-centre consensus forecast
  - Ensemble size: 125 members
- The WMO Annual to Decadal Climate Update is a high-profile climate report
- The number of products and their complexity are increasing on the website
- Next steps:
  - Link with EPESC Lighthouse Activity
  - Increase the use of decadal predictions by Regional Climate Outlook Forums, Regional Associations, and Regional Climate Centres with the new regional index predictions
  - Help develop and support climate services derived from decadal predictions
  - Improve website, data access and provide climate indices

