

The DEMETER Multi-Model Seasonal Forecast System

Renate.Hagedorn@ecmwf.int

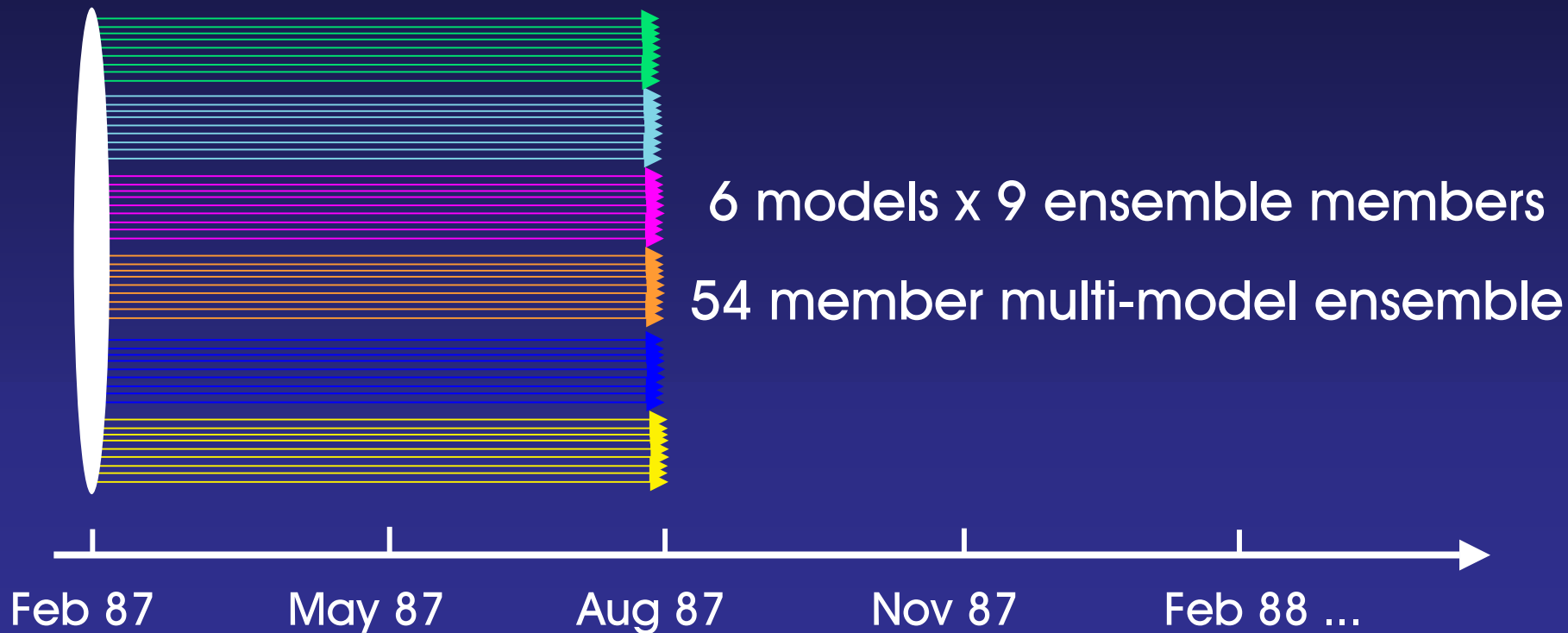
Francisco.Doblas-Reyes@ecmwf.int

European Centre for Medium-Range Weather Forecasts

Multi-Model Ensemble System

DEMETER system: 6 coupled global circulation models

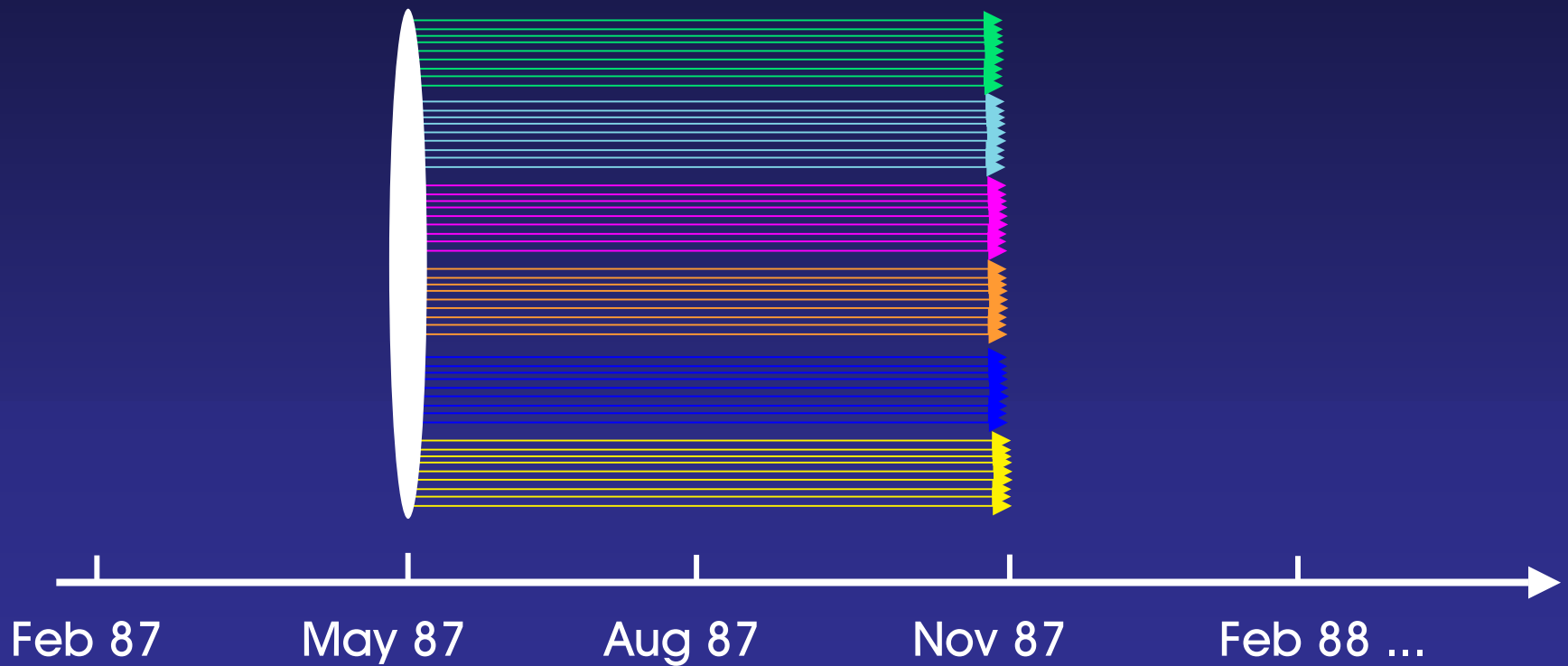
CNRM (FR) ECMWF (INT) INGV (IT) LODYC (FR) MPI (DE) UKMO (UK)



Multi-Model Ensemble System

DEMETER system: 6 coupled global circulation models

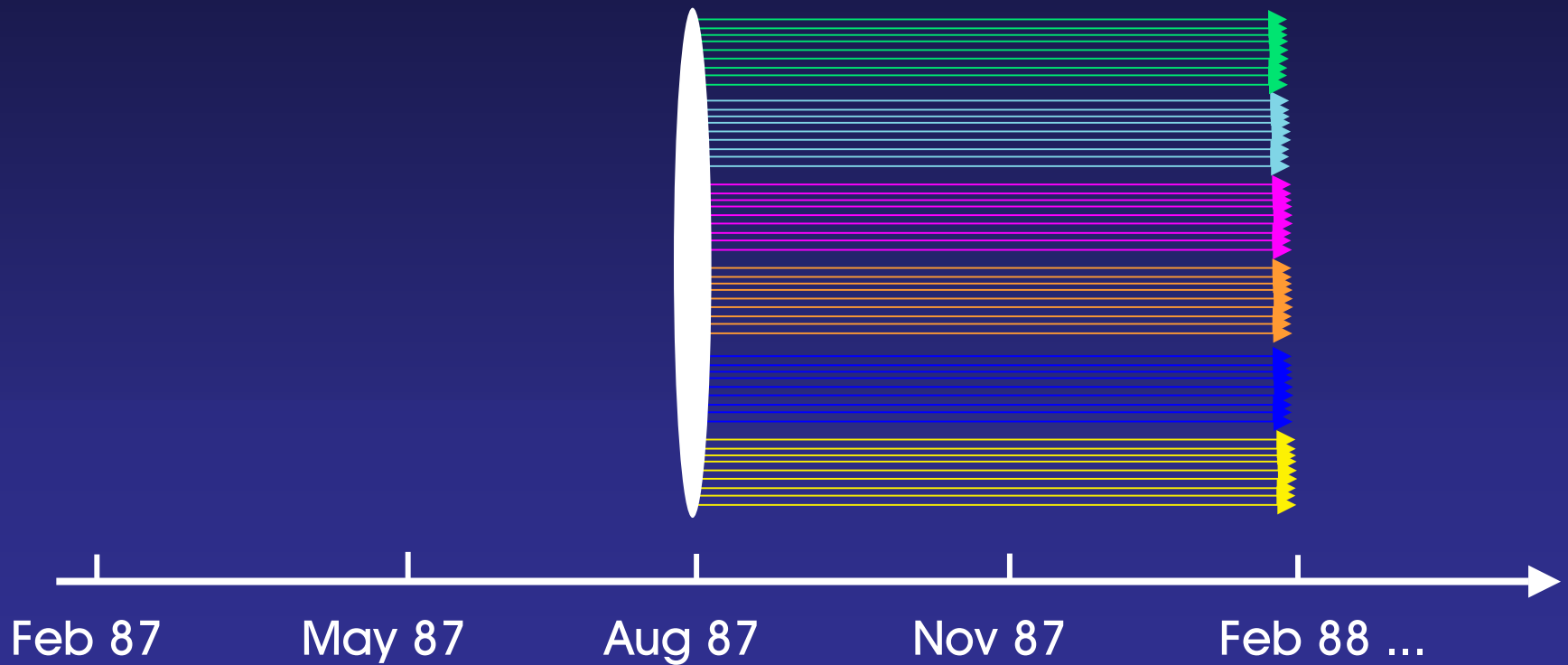
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Multi-Model Ensemble System

DEMETER system: 6 coupled global circulation models

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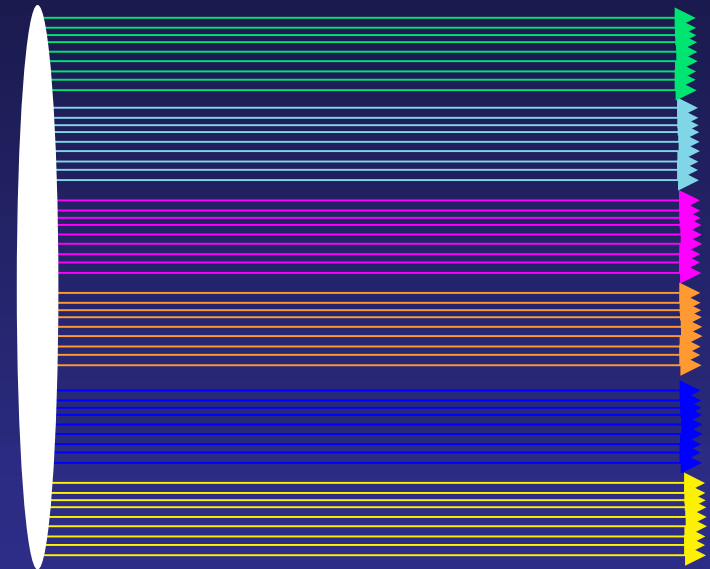


Multi-Model Ensemble System

DEMETER system: 6 coupled global circulation models

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54 member multi-model ensemble
= 1 hindcast

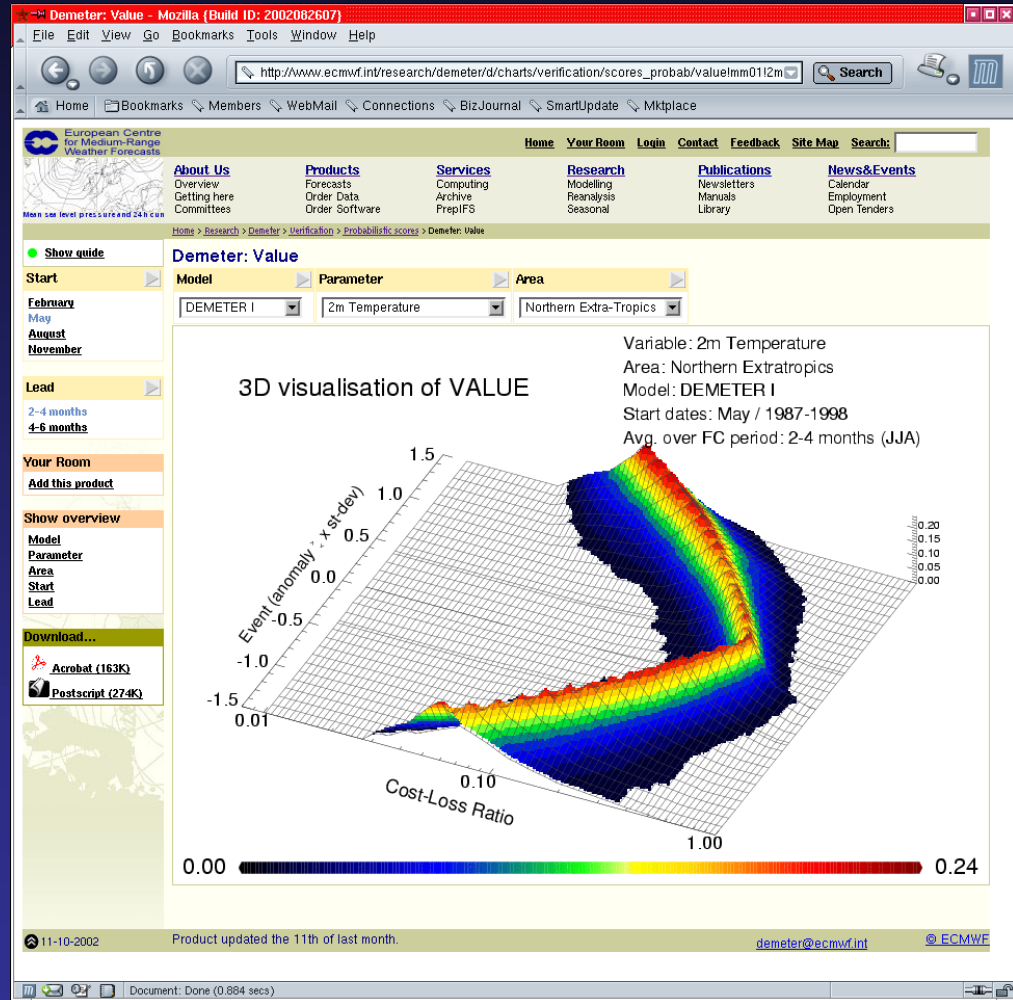


Production for: 1958-2001 = $44 \times 4 = 176$ hindcasts

Assessment of Seasonal Forecast Potential

- Use comprehensive set of hindcasts to determine skill...
 - for various parameters (rain, temperature...)
 - in different areas of the globe
 - for various lead times
 - in different seasons
 - for individual models vs. multi-model
- ... in applying a broad range of skill measures

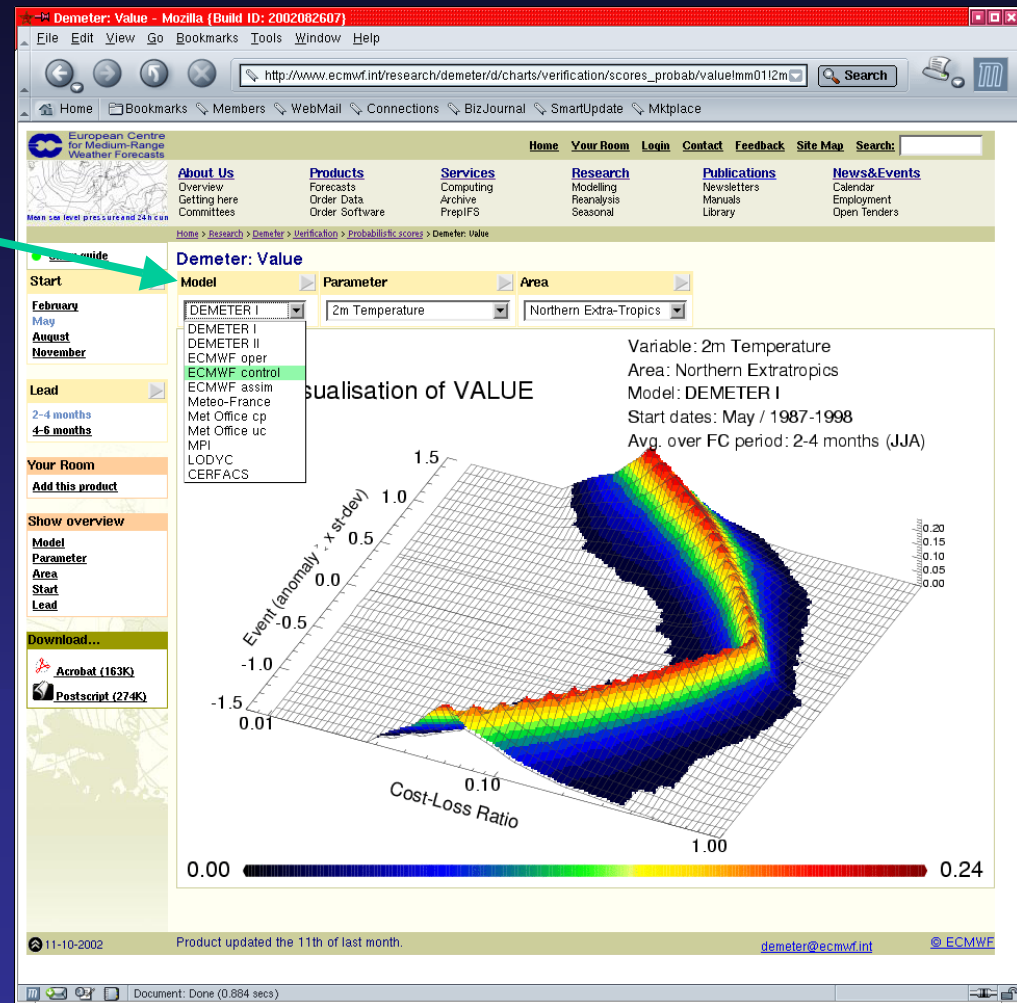
Verification



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Verification

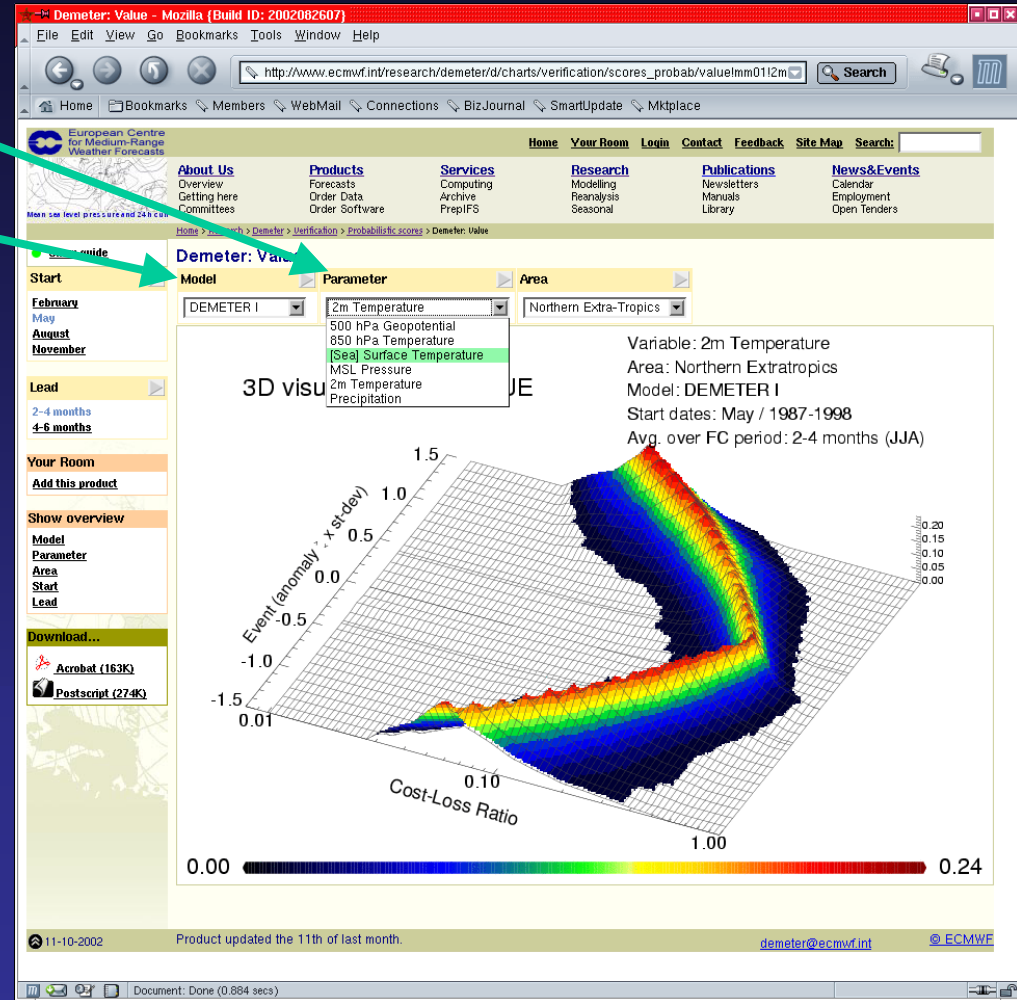
Model



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Verification

Parameter
Model



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Verification

Parameter

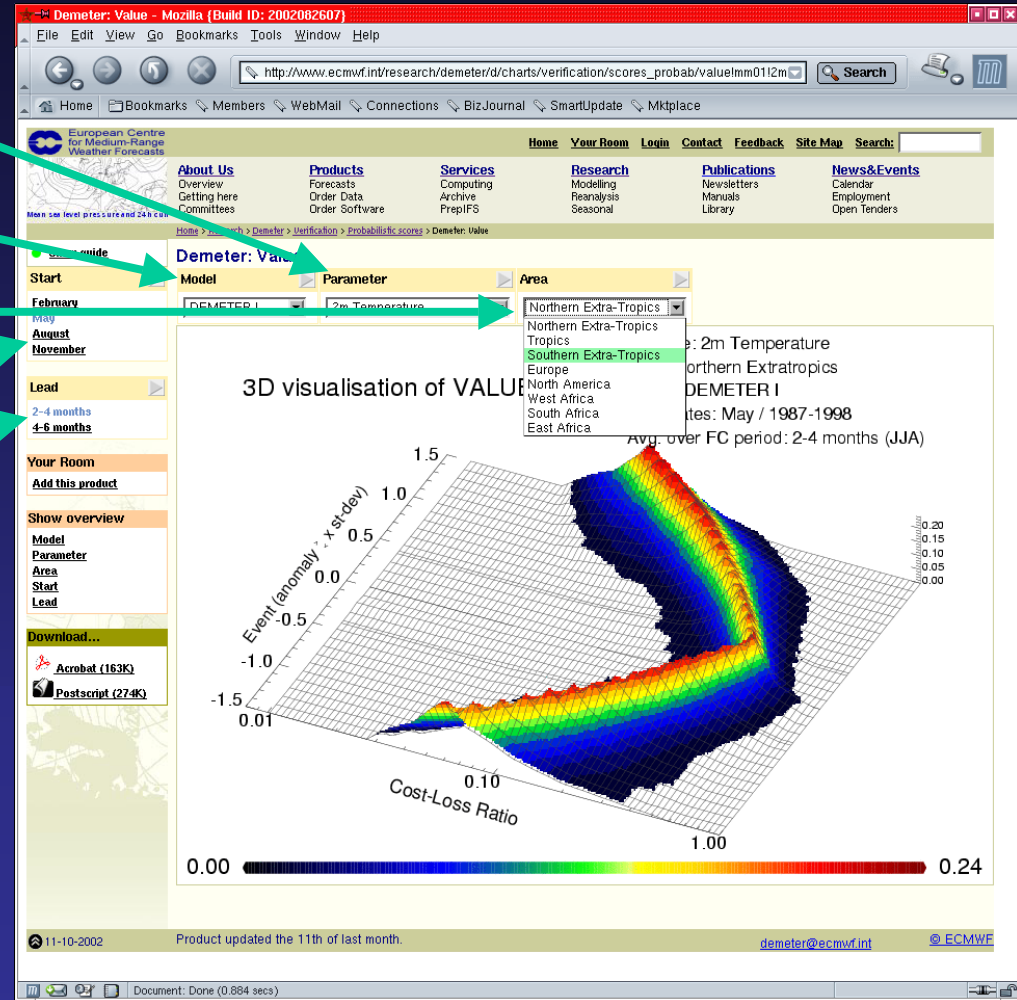
Model

Area

Season

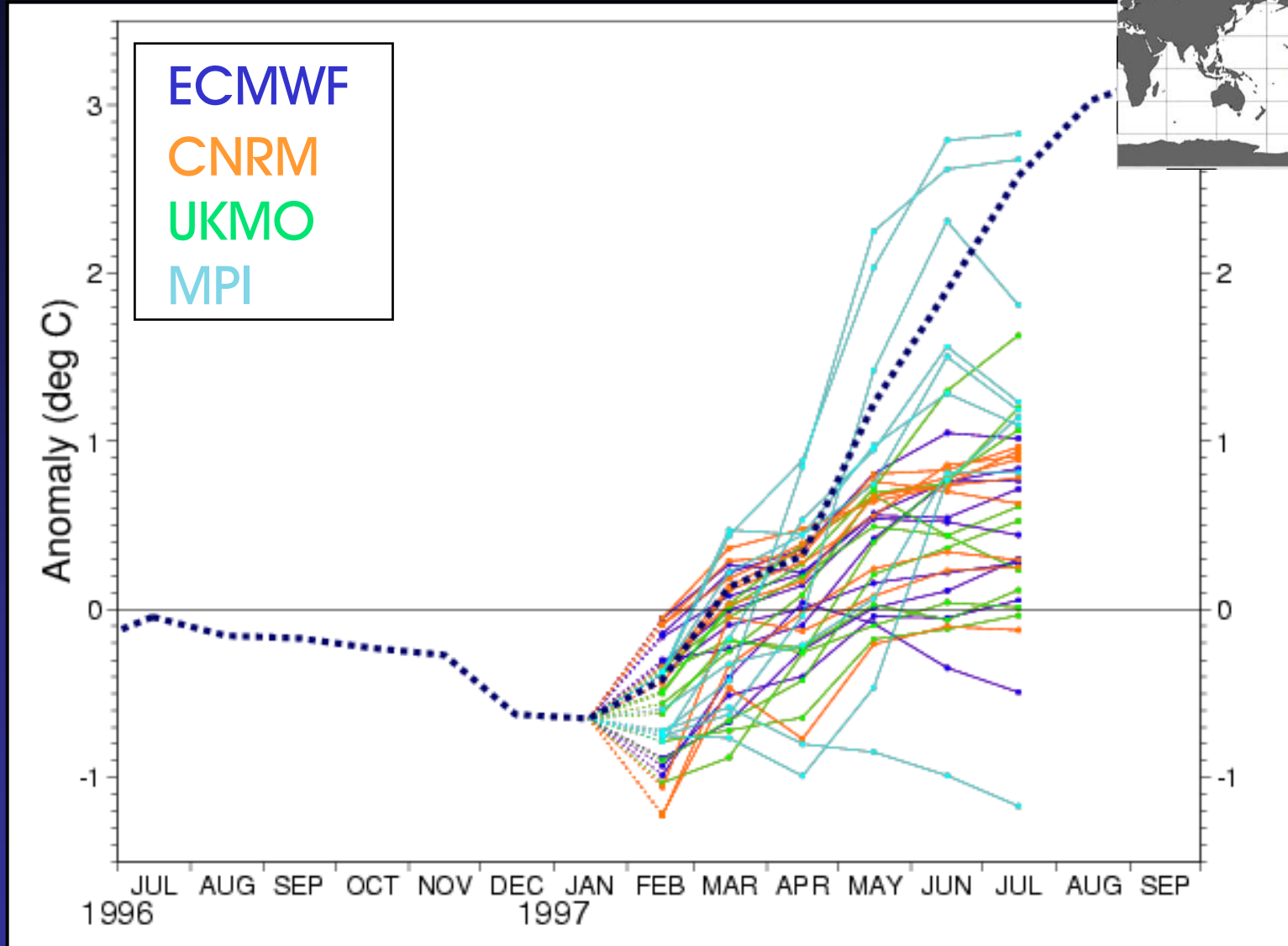
Lead Time

- Bias
- Indices
- Deterministic Scores
- Probabilistic Scores
- Single vs. multi-model

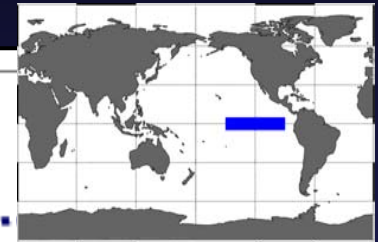
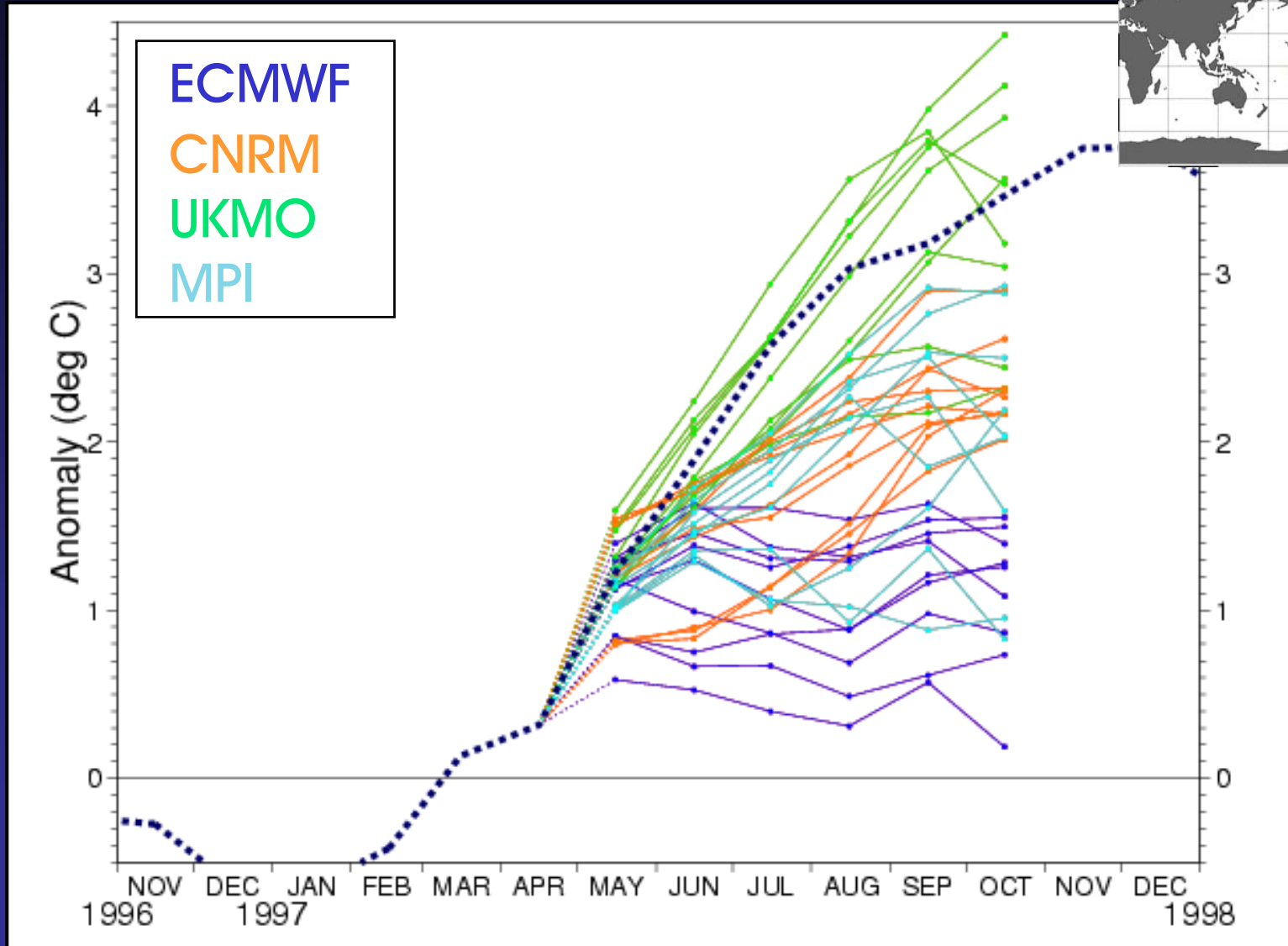


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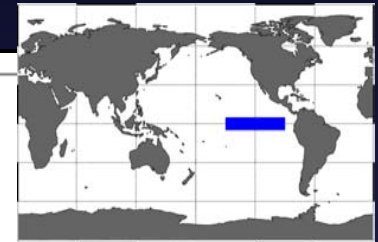
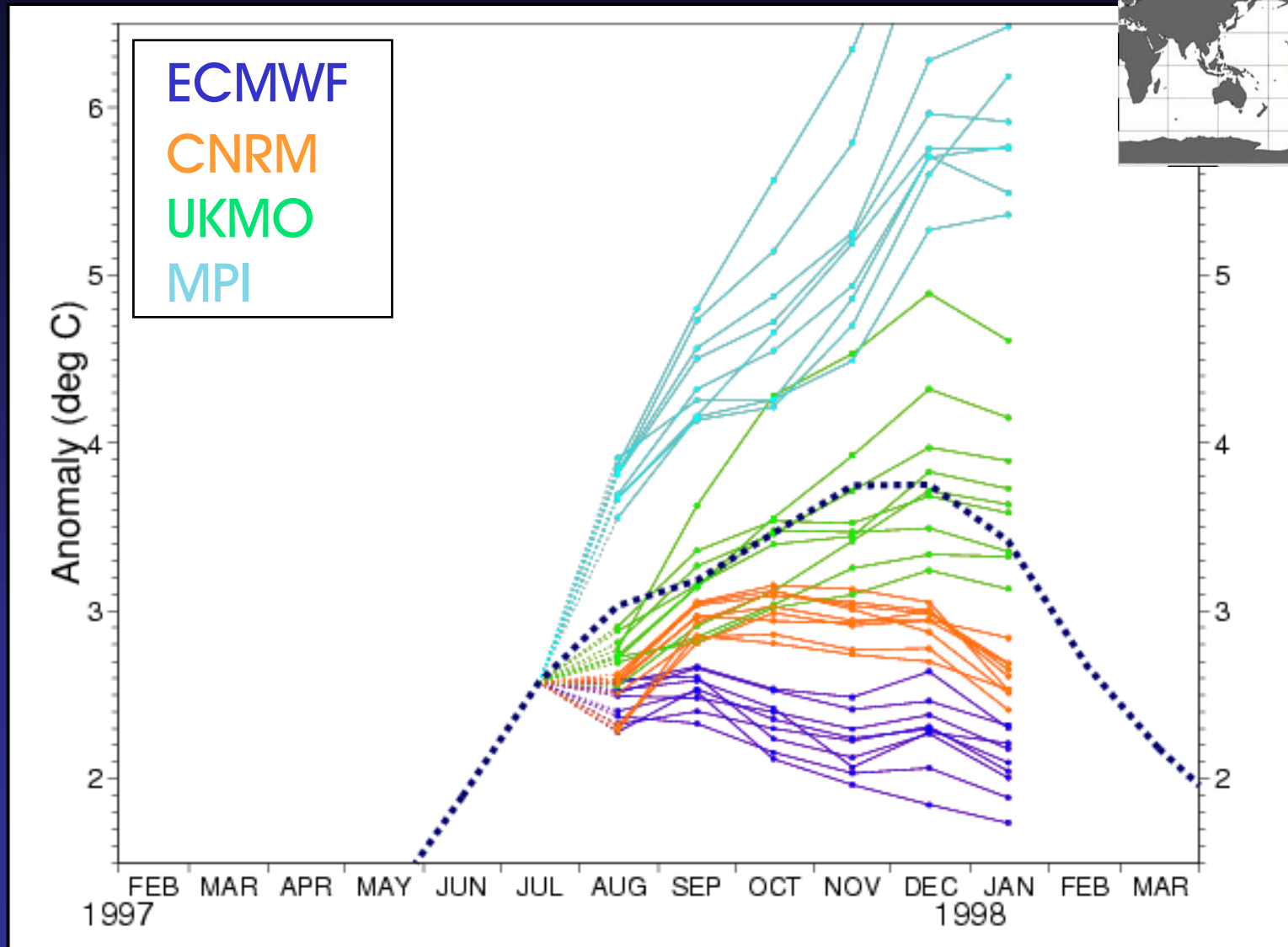
Niño-3 SST hindcasts



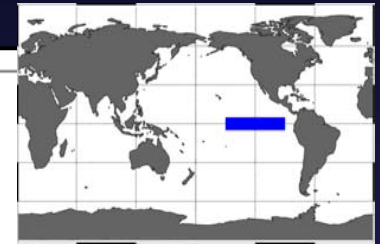
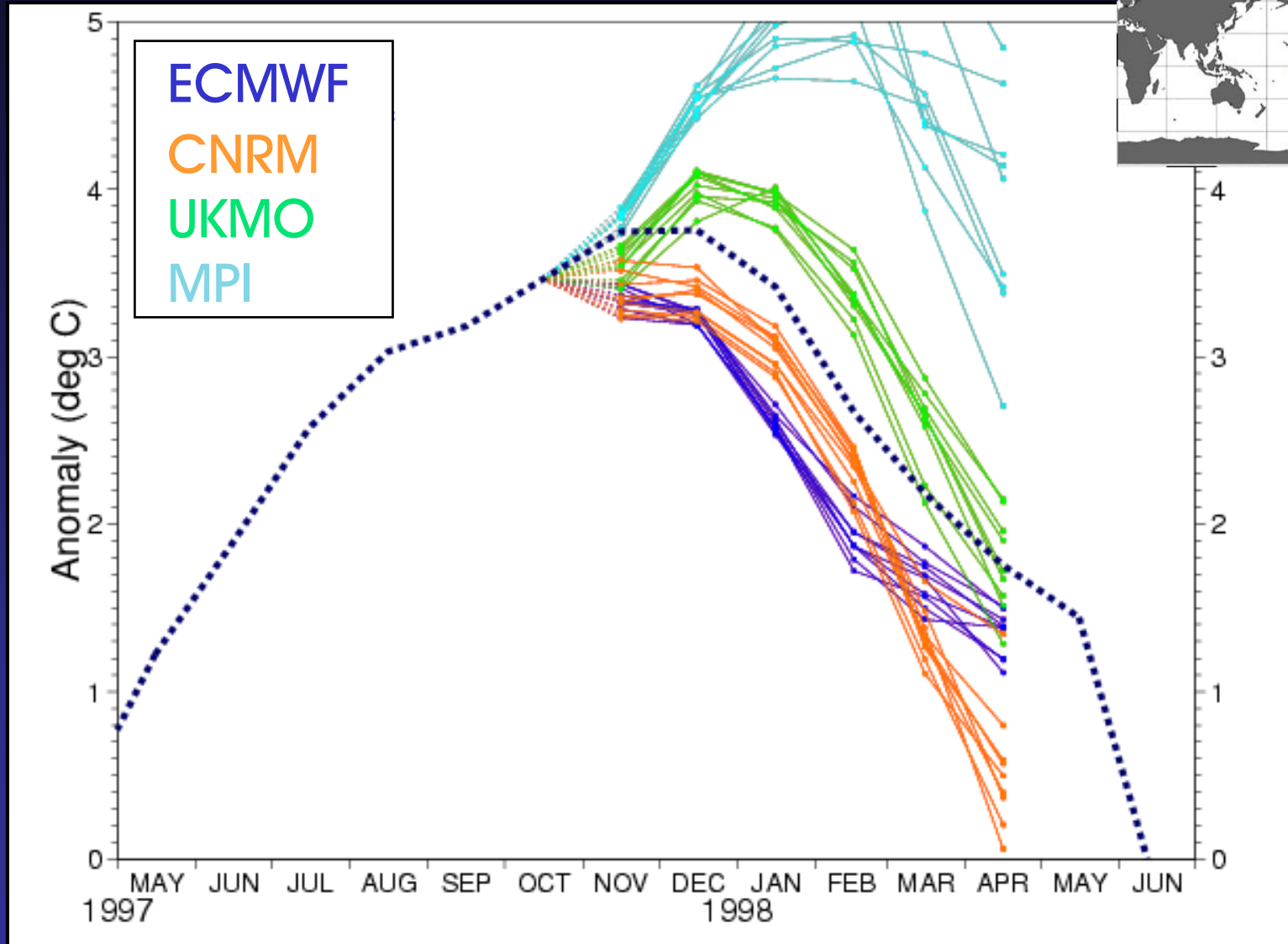
Niño-3 SST hindcasts



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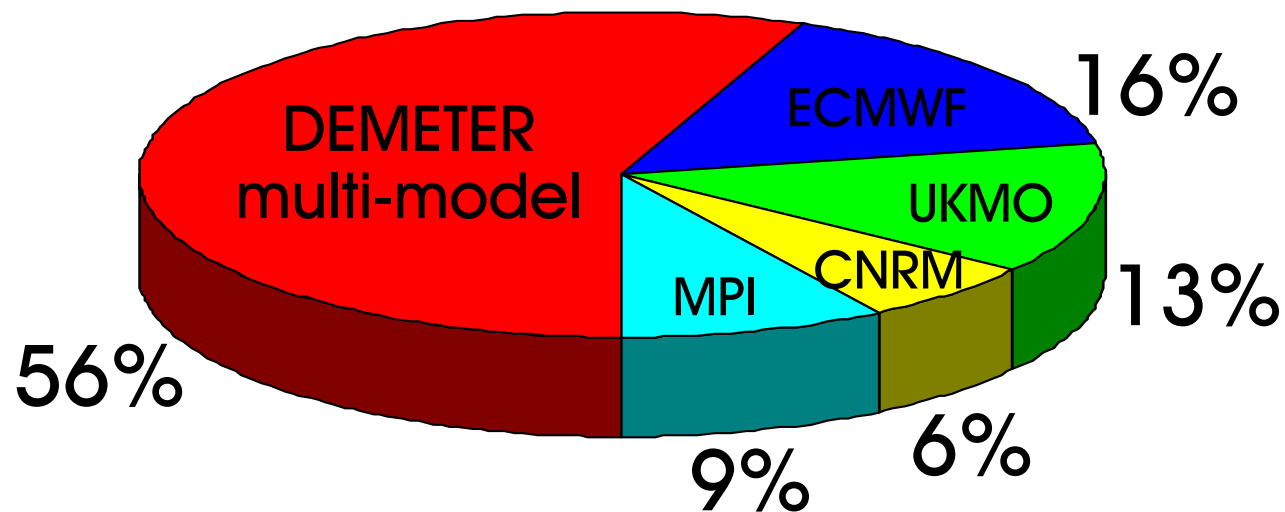


Niño-3 SST hindcasts



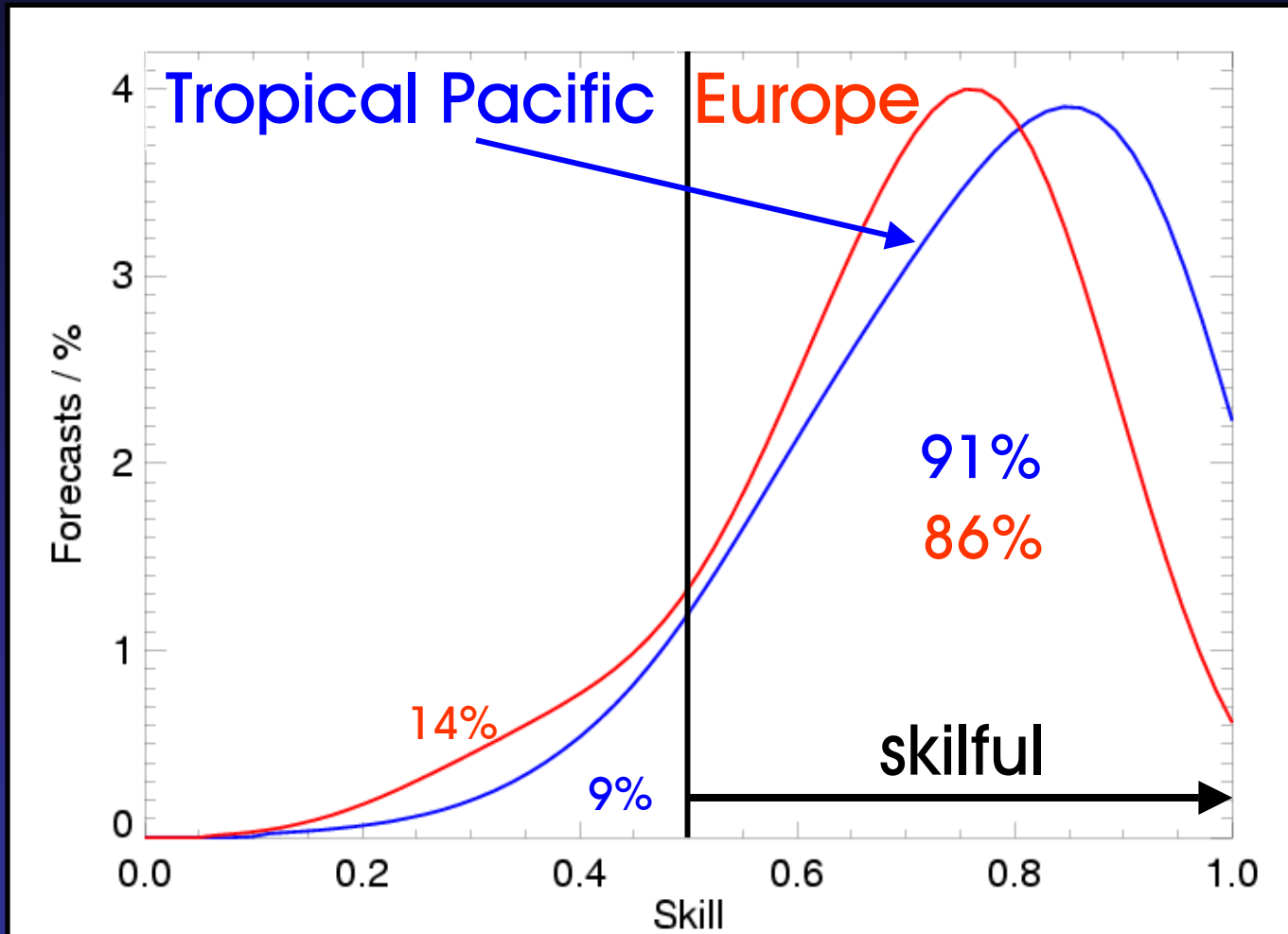
The most reliable predictions of climate risk are made by combining all individual DEMETER models

Test of individual and multi-model performance
8 regions, 4 seasons, 4 events, 2 lead times



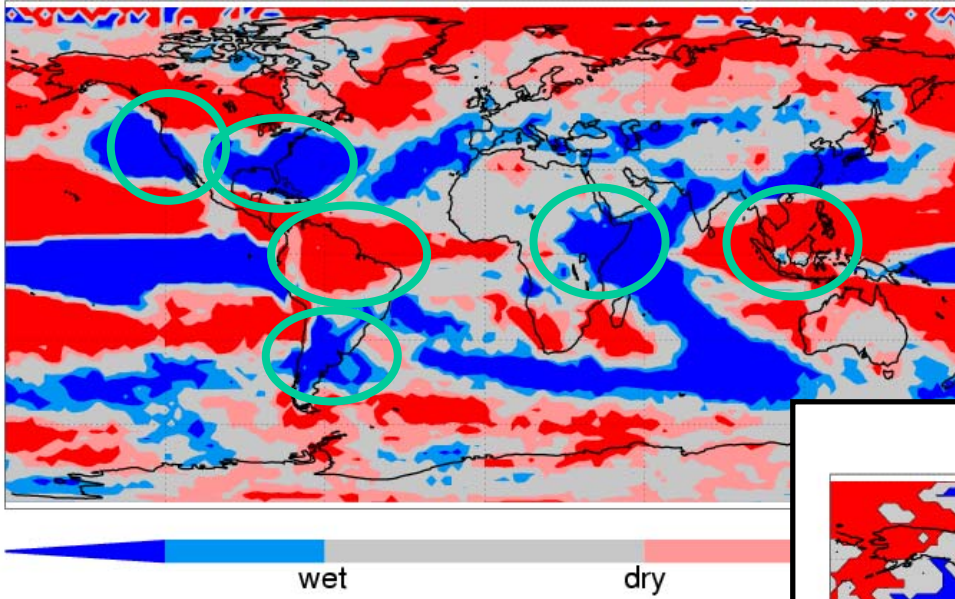
Increased Reliability = Increased Economic Value

DEMETER multi-model performance for spring temperature forecasts



Winter 1997 El-Niño: Precipitation Prediction

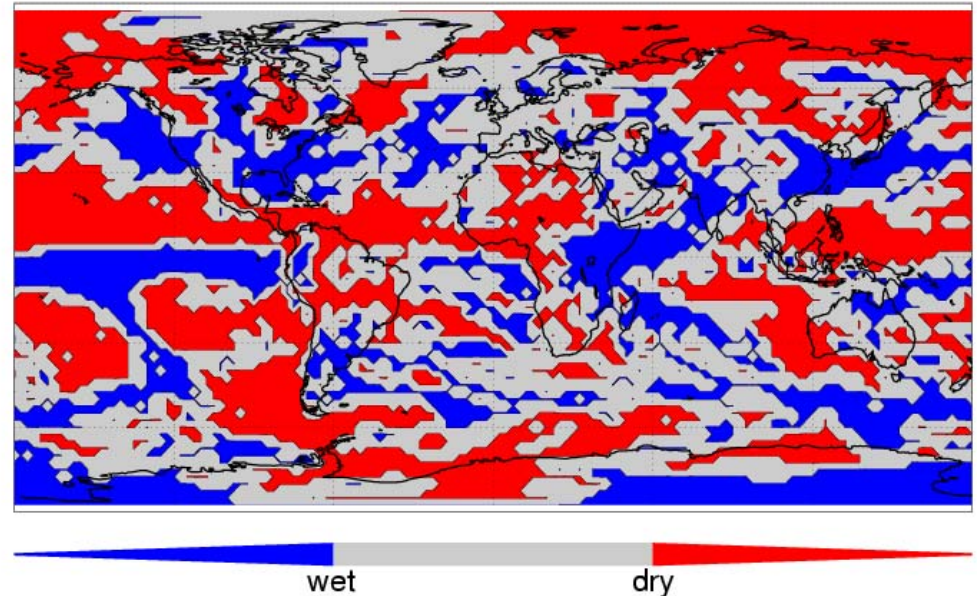
DEMETER multi-model



- Flooding: East Africa
Uruguay / Argentina

- Rainforest fires: Amazonia
- Storm damage: California
- Tornadoes: Florida

Verification

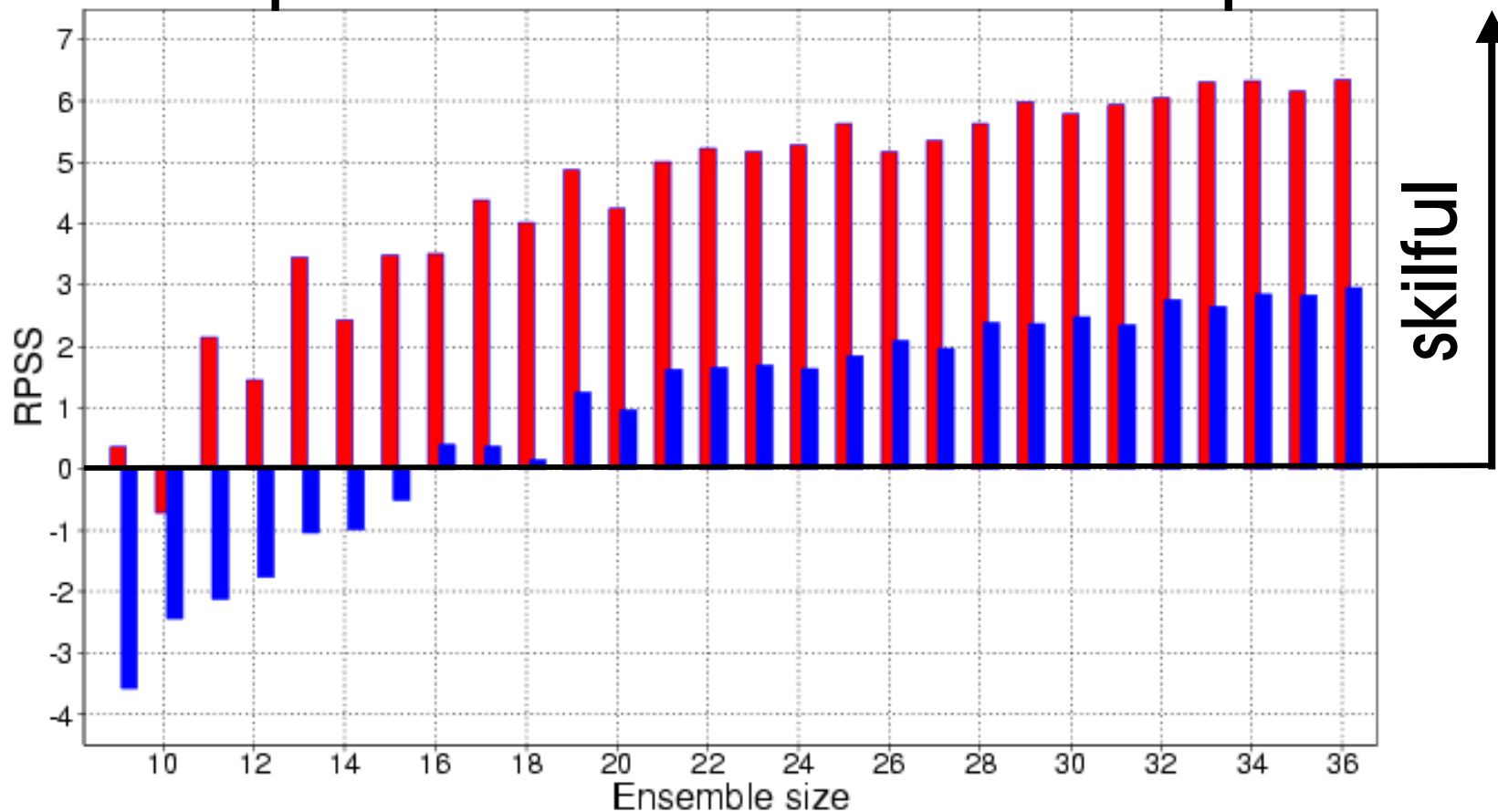


Model Performance vs. Ensemble size

Multi-Model

Single Model

Precipitation in summer over Tropics



Summary

- DEMETER multi-model ensemble system fully installed
- Extensive set of hindcasts is being produced
 - 1987 – 1998 available, 1958 onwards started
- First assessment of skill
 - confirms potential of seasonal forecasting
 - demonstrates multi-model advantages

Online Data Distribution

- online data access tool under development
 - monthly means
 - choice of selected variables
 - choice of space and time range
 - choice of data format (GRIB or NetCDF)
 - installation envisaged for end of 2002