

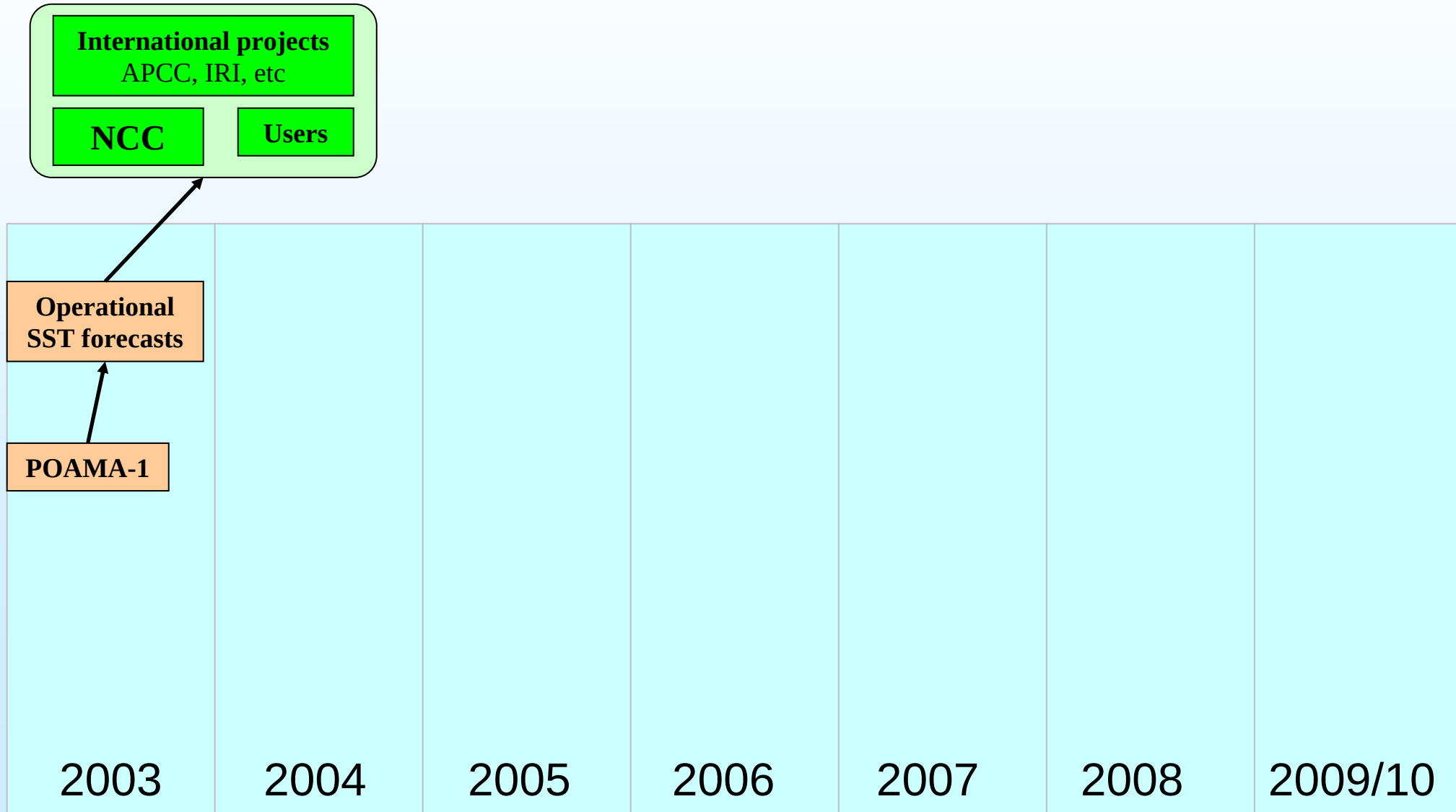
POAMA-2 and longer term plans for seasonal prediction at BMRC

Oscar Alves
BMRC

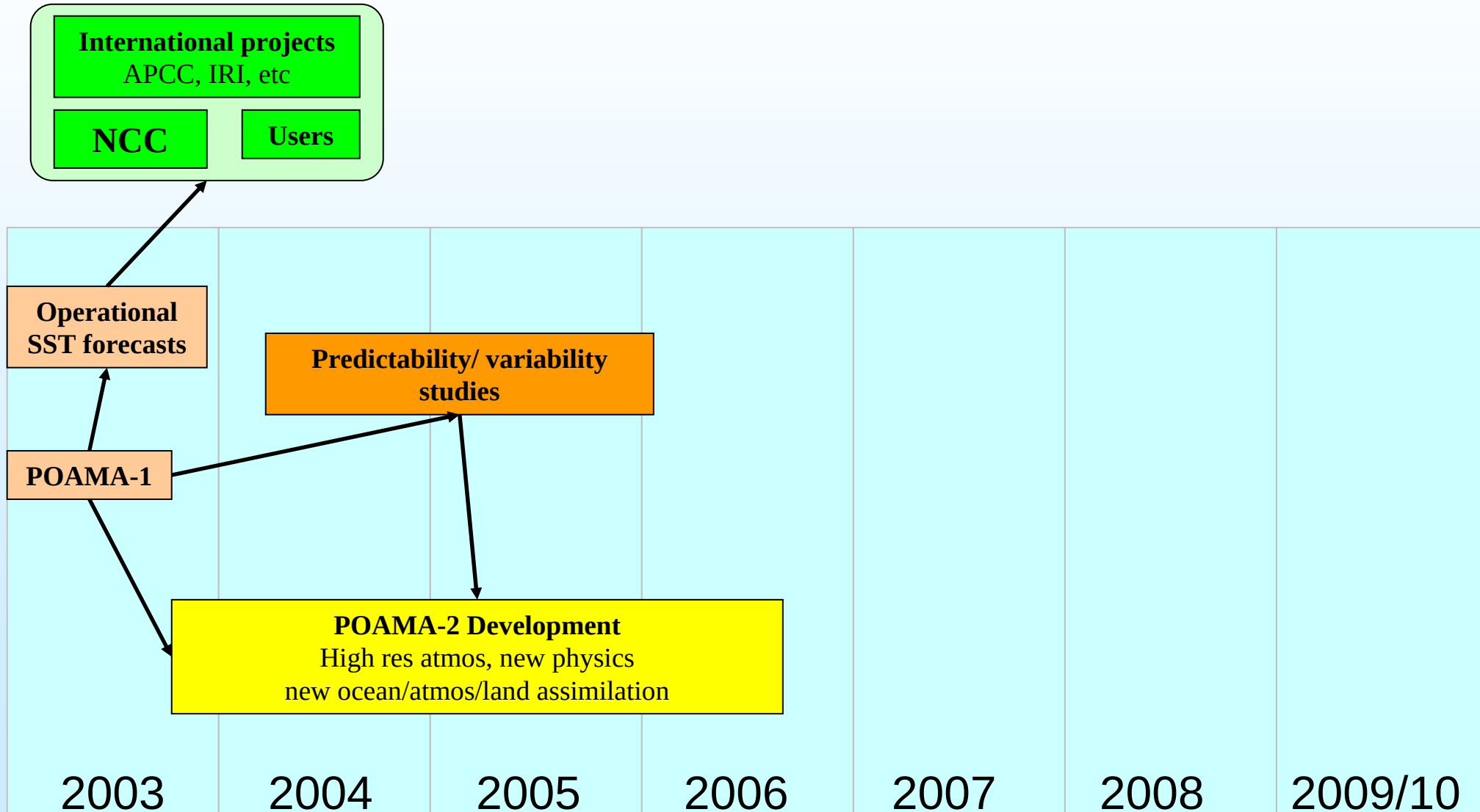
Plan

- Overview
- POAMA-1.5/2
- Brief results
- Longer term
- Summary

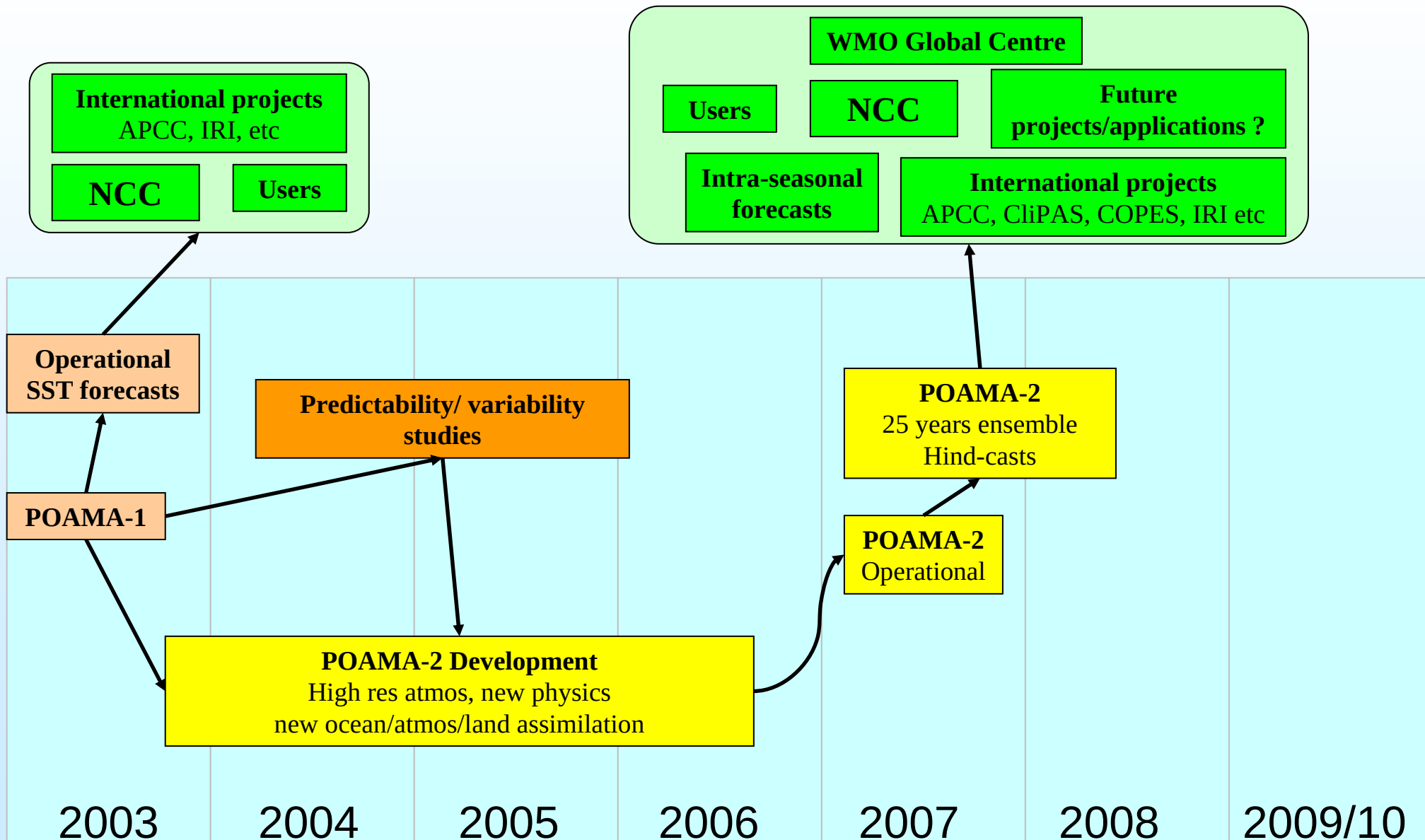
POAMA/ACCESS System



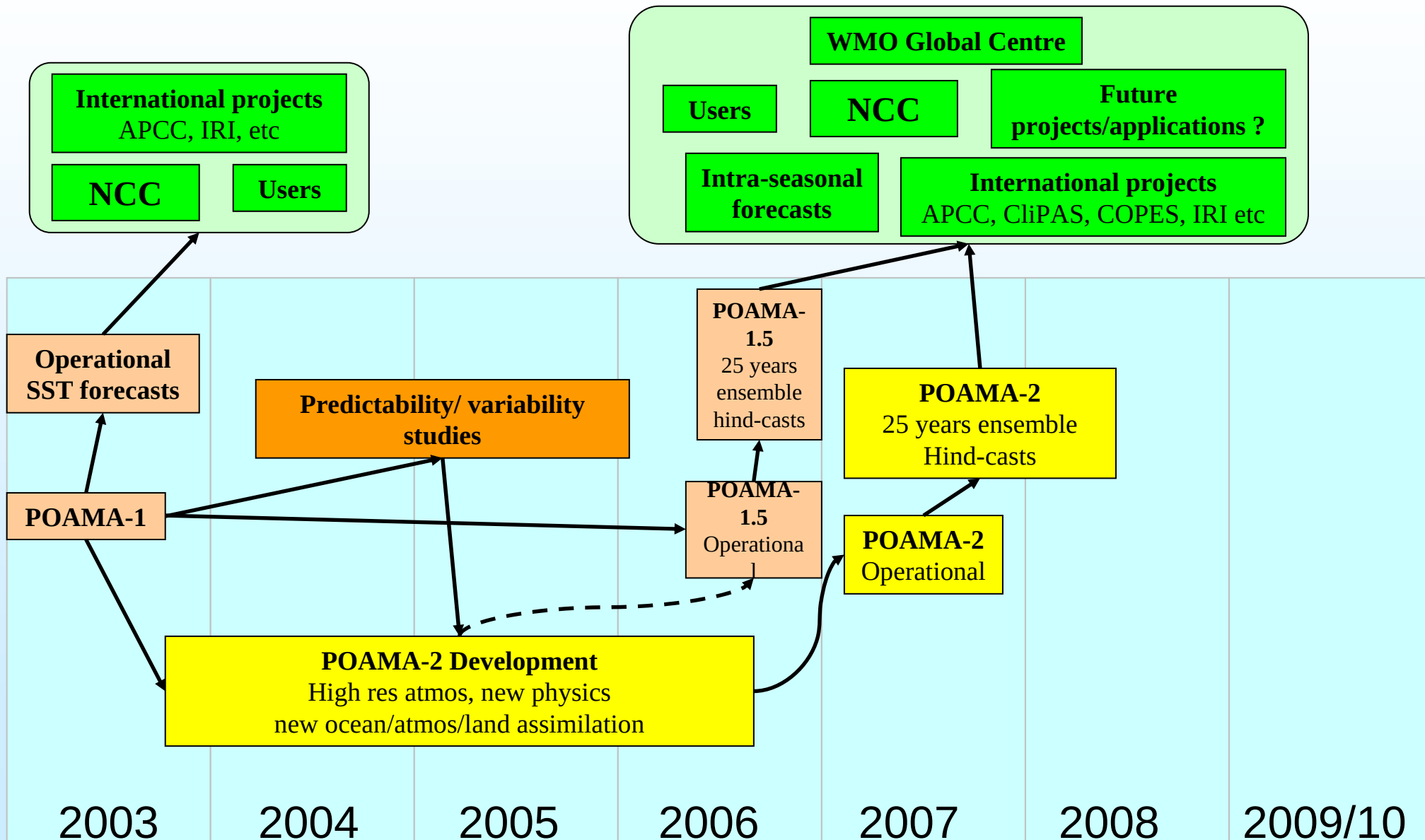
POAMA/ACCESS System



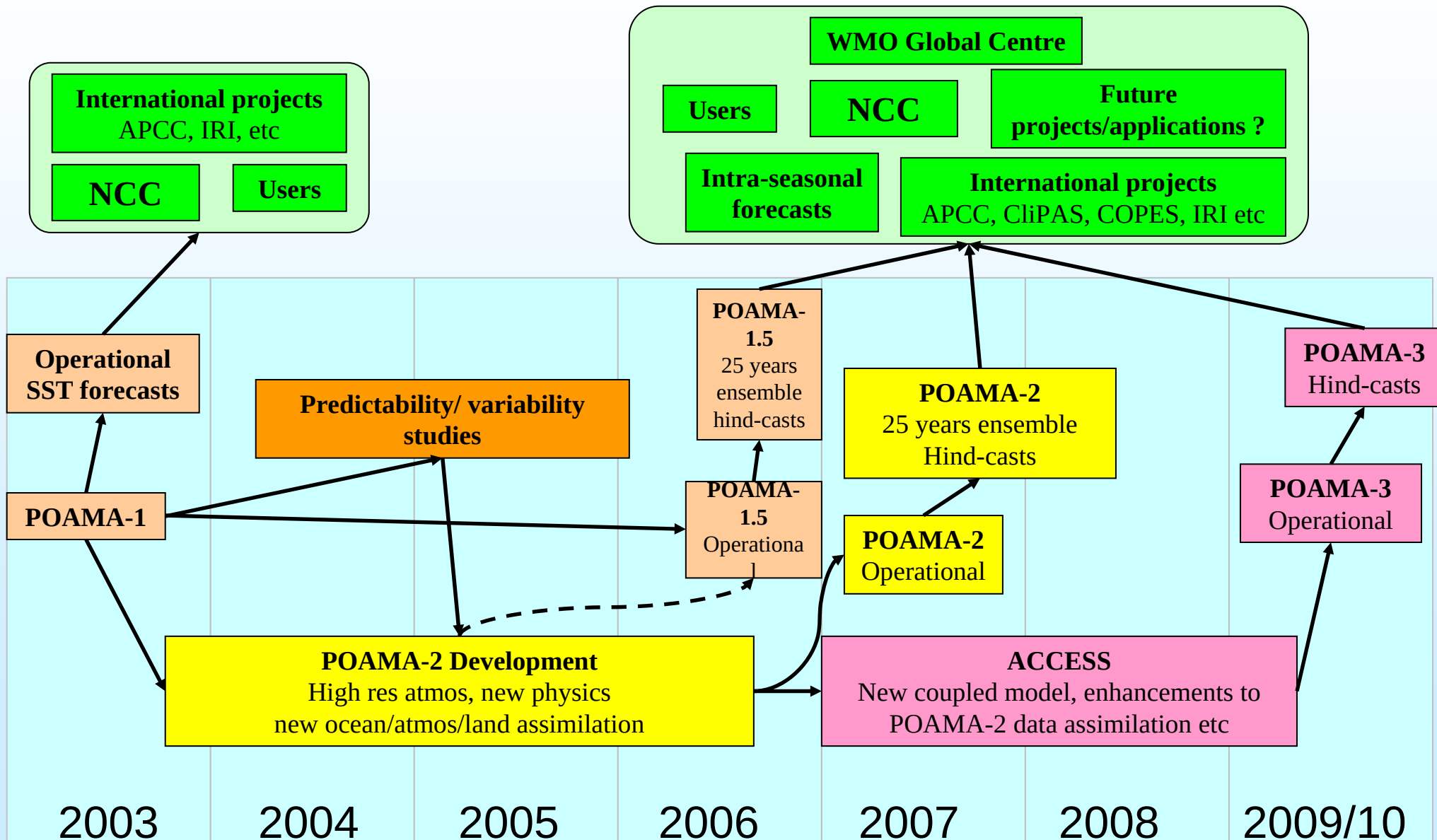
POAMA/ACCESS System



POAMA/ACCESS System



POAMA/ACCESS System



POAMA-1/1.5/2 comparison: Models

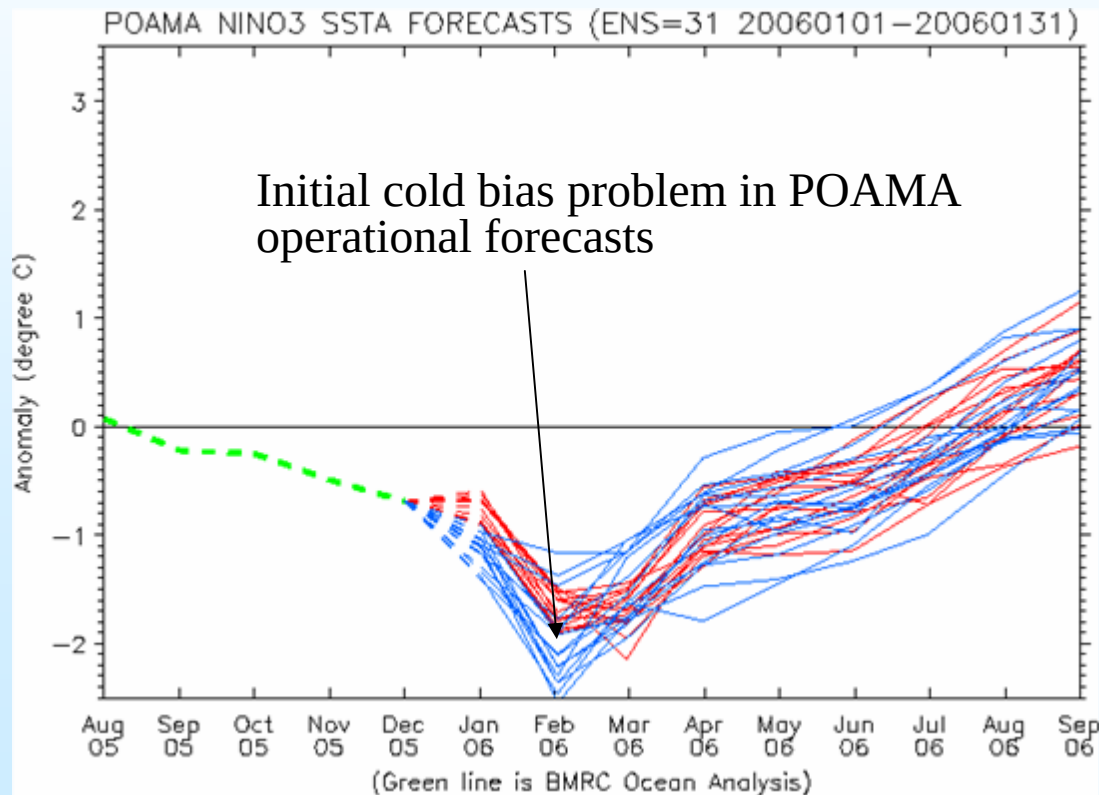
	POAMA-1	POAMA-1.5	POAMA-2
When	2002	2006	2007
Atmospheric Model	BAM3 T47 17 Levels	Minor corrections Coastal problems removed	BAM5 T95 60 Levels New Phys: Radiation, GWD, Boundary layer, etc
Coupler	OASIS 3 Daily coupling	OASIS 3 3 hour coupling + current/stress coupling	OASIS 4 3 hour coupling + current/stress coupling
Ocean Model	ACOM2	ACOM2 Re-tuned vertical mixing	ACOM2 Re-tuned vertical mixing
Land model	Bucket scheme	Bucket Scheme	ECMWF Layer model

POAMA-1/1.5/2 comparison: Initialisation

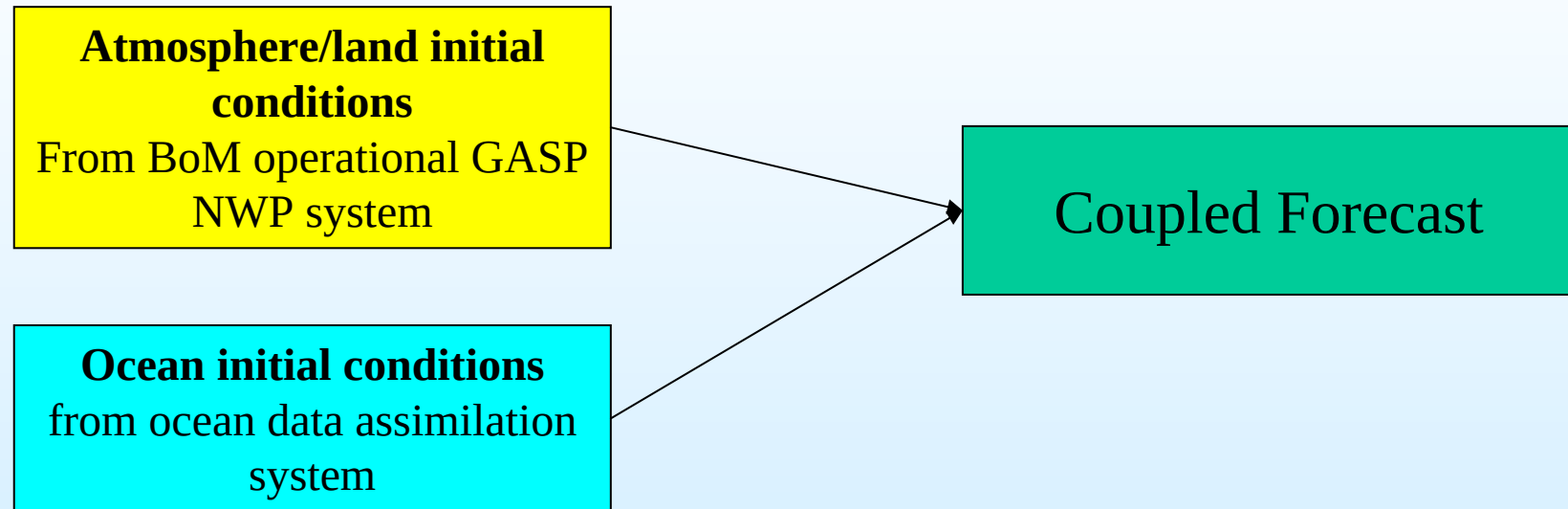
	POAMA-1	POAMA-1.5	POAMA-2
Atmospheric	ERA40/GASP	Nudging Scheme (ERA40/GASP)	Nudging Scheme
Land	Climatology	Atmos nudging	Atmos nudging
Ocean	Univariate Optimum interpolation	Same	Pseudo - EnKF Multivariate, ensemble covariances
Hind-cast ensembles	1 per month 15 years	>10 per month 26 years	>10 per month 26 years

POAMA-1 cold bias problem

POAMA-1 problem traced back to changes in operational NWP system in August 2005



Initialisation of original operational POAMA-1



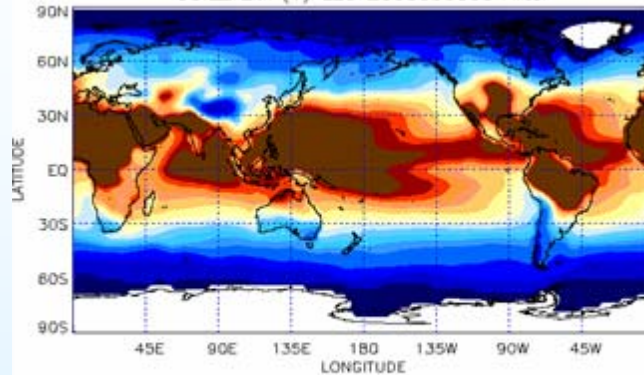
Problem - NWP system changed it's land surface model - so initial conditions were no longer consistent with POAMA land-surface model and POAMA hind-casts

Changes to GASP NWP operational land initialisation system

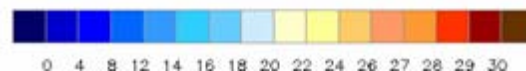
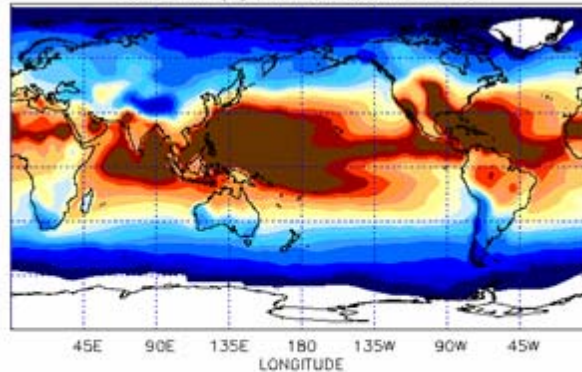
Old NWP
land model

Soil surface temperature

SOIL_TEMP(1) L29 2005090500 After

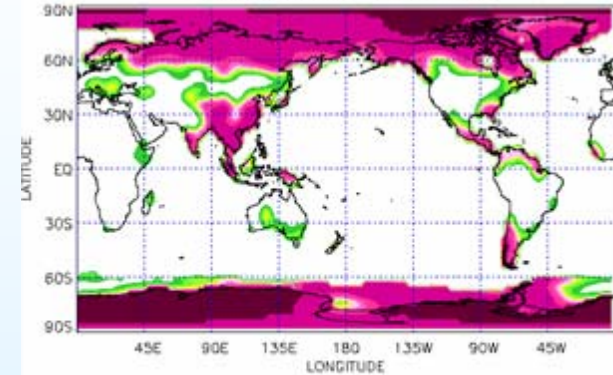


SOIL_TEMP(1) L33 2005090500 After

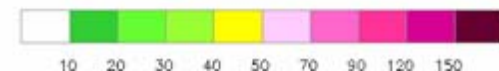
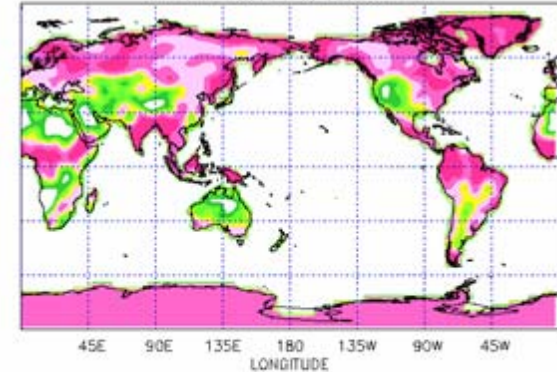


Soil surface wetness

SFC_WET L29 2005090500 After



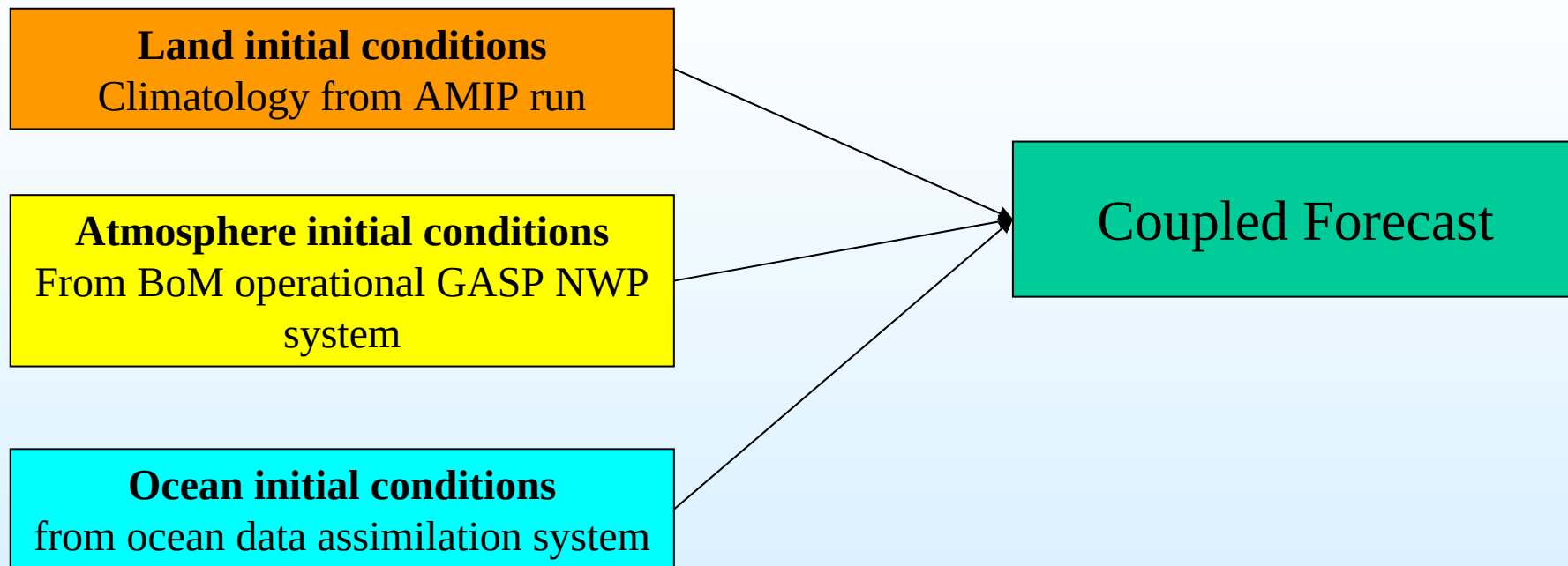
SFC_WET L33 2005090500 After



New NWP
land model

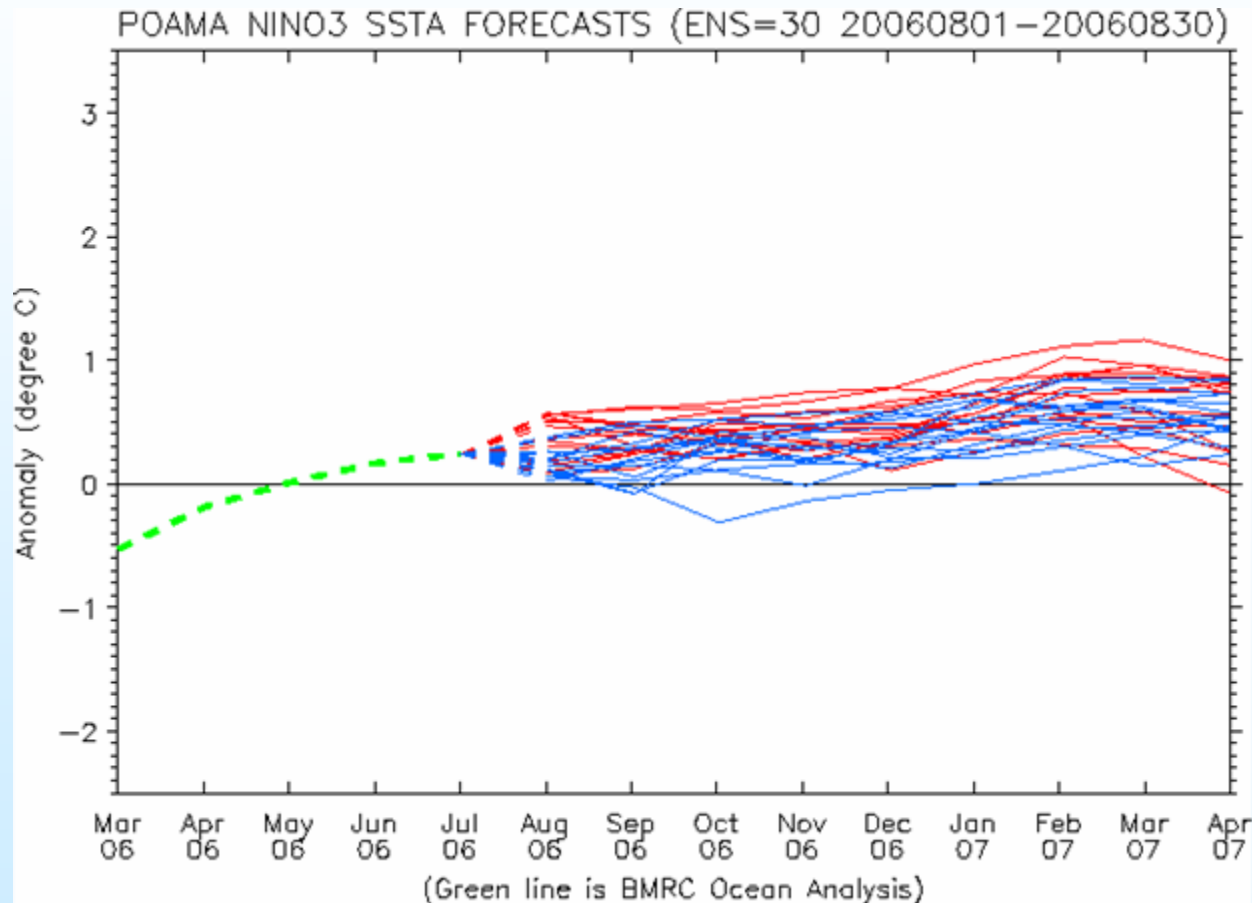
Significant differences in land surface over South America led to changes in atmospheric circulation and enhance surface winds over East Pacific, which led to ocean cooling.

Modified POAMA-1 initialisation



- Pragmatic solution to avoid dependence on changes in NWP system
- Land surface conditions now taken from climatology calculated from AMIP run using same land model as in POAMA
- Better solution left to POAMA-1.5
- Highlights importance of consistency between real-time forecasts and hind-casts

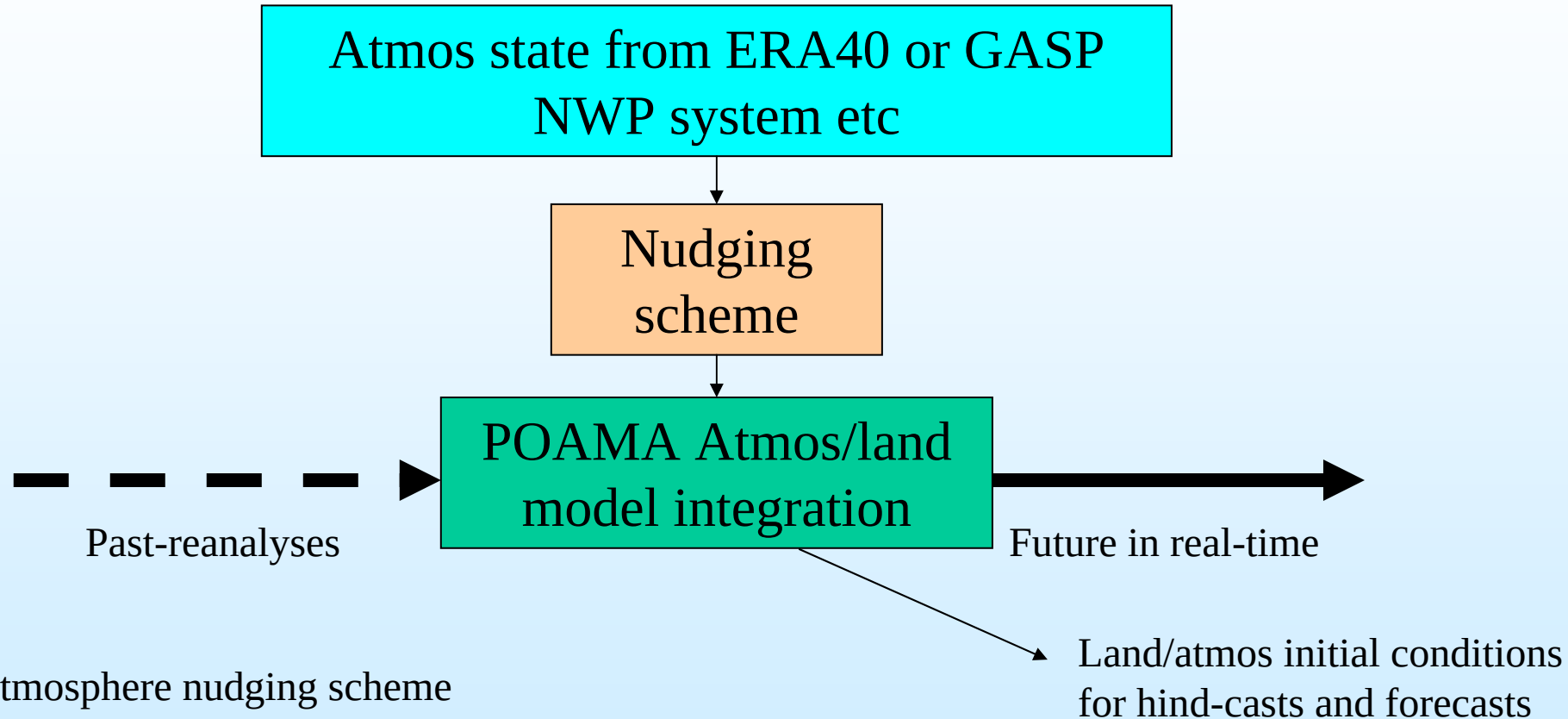
Latest forecast plume



Problem no longer present

POAMA 1.5/2 - New atmos/land initialisation system

Debbie Hudson



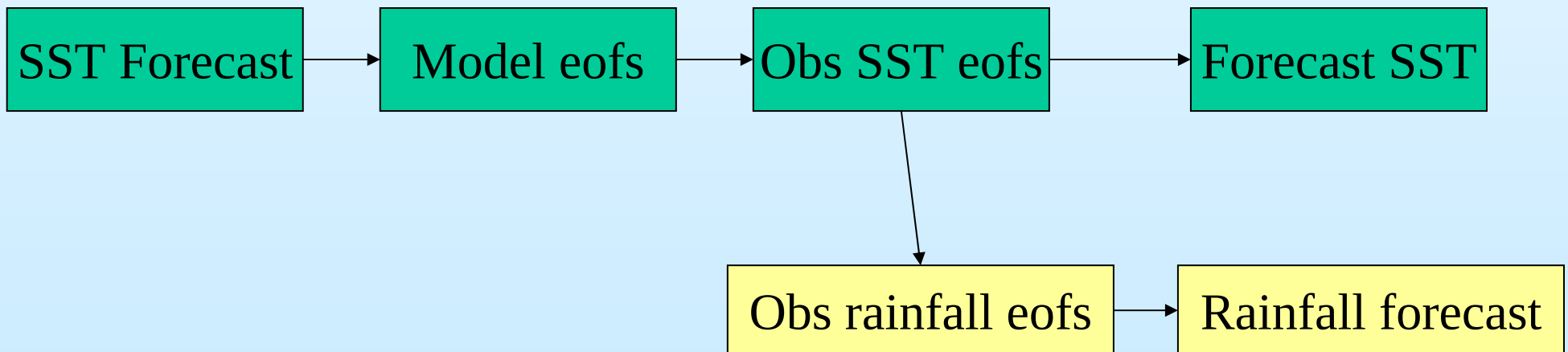
- New atmosphere nudging scheme
- POAMA land model initialised by rainfall from nudged atmosphere
- Consistent for hind-casts and real-time forecasts (same land model)
- Provides buffer between operational NWP system changes and POAMA
- A step towards coupled data assimilation

Bridging/bias correction

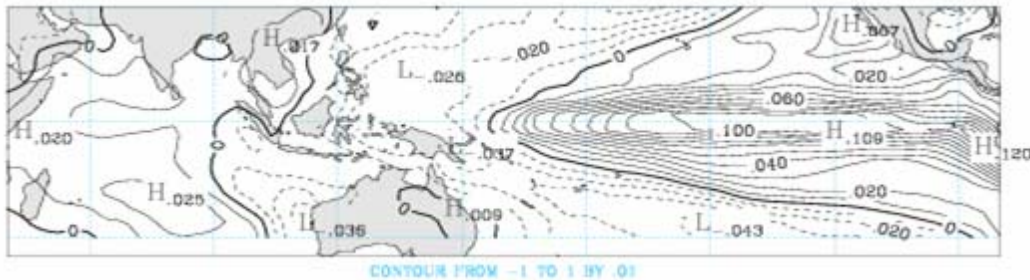
Eun-pa Lim and Harry Hendon

Focus for POAMA1.5/2 is rainfall prediction

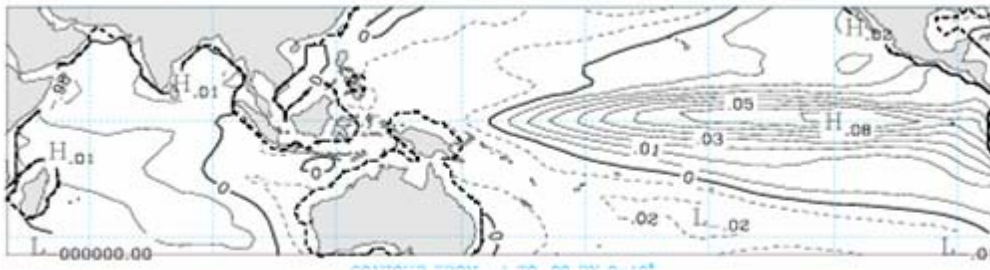
Australian/ENSO relationship - dependent on details of ENSO - e.g. where maximum warming occurs $\sim$ EOF2 (Wang and Hendon 2006)



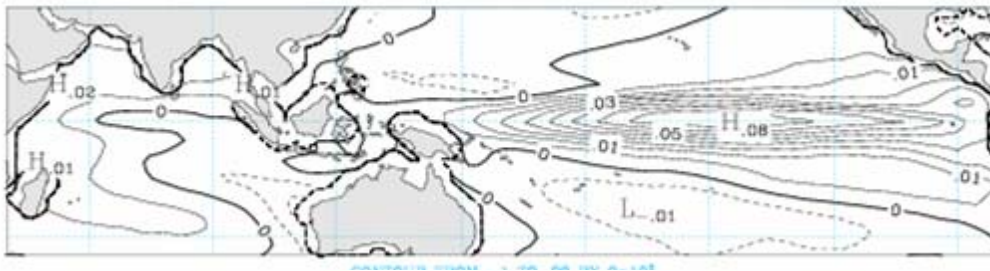
POAMA-1: 1st EOFs (1987 – 2002)



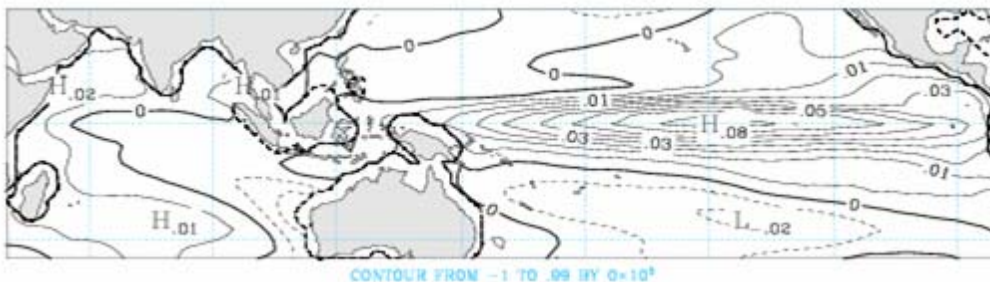
OBS (41.4 %)



LT 1 (46.9 %)

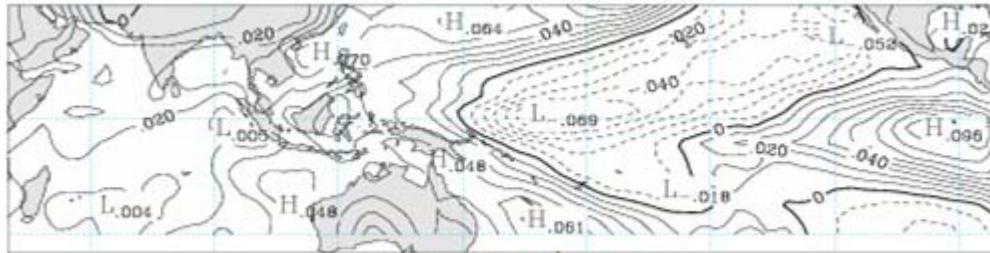


LT 5 (49.1 %)

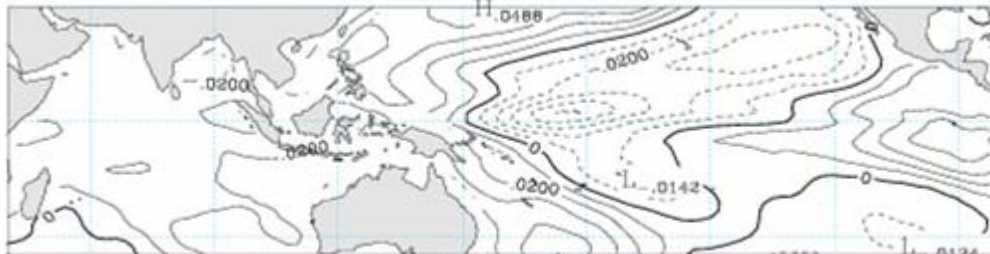


LT 9 (52.4 %)

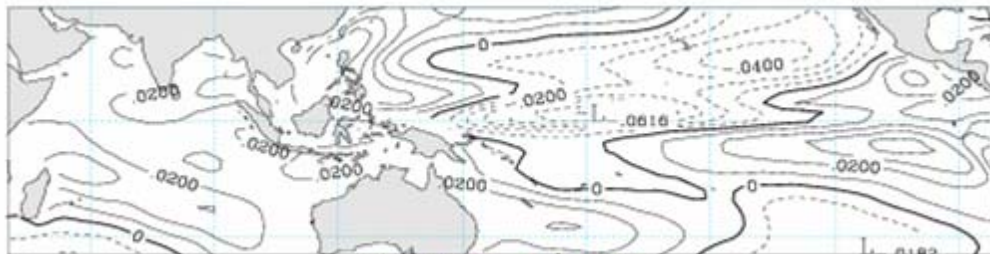
2nd EOFs (1987 – 2002)



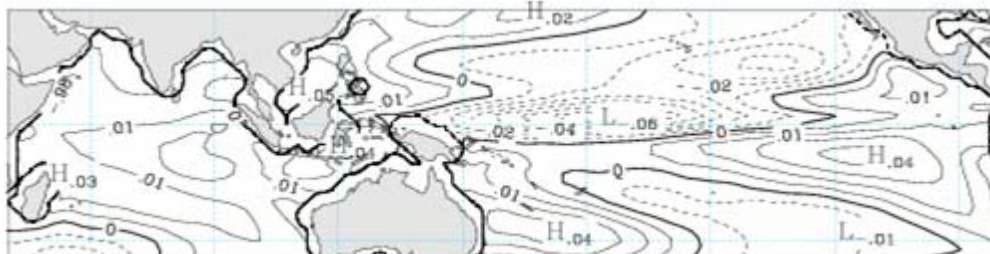
OBS (14.9 %)



LT 1 (13.1 %)



LT 5 (11.9 %)



LT 9 (9.9 %)

CONTOUR FROM -1 TO .99 BY 0.10

Correlation Coefficients between the PCs from OBS and POAMA (180 forecasts)

	1 month lead	5 month lead	9 month lead
EOF PC1	0.98	0.77	0.67
EOF PC2	0.93	0.65	0.54
EOF PC3	0.63	0.02	0.15

ACCESS

Australian Community Coupled Earth System Simulator

Joint project between BMRC, CSIRO, Universities, (and UKMO - atmosphere)

Develop end-to-end earth system model

Ranging from NWP - Seasonal prediction - Climate Change

Covering modelling and data assimilation

Started in 2006

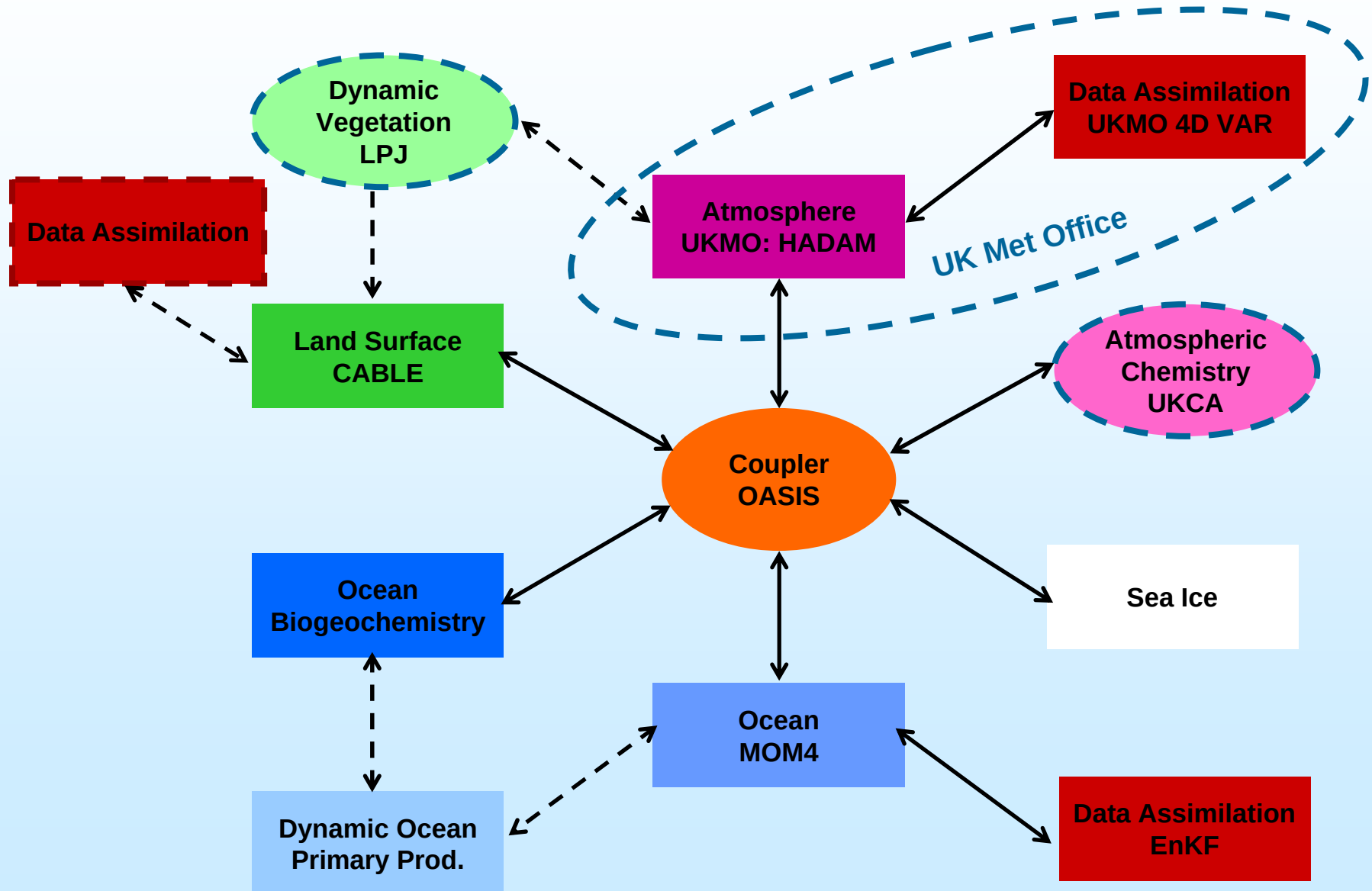
Aim deliver system for:

NWP (new model + 4D Var)- 2007/8

Intra+seasonal POAMA3 ~2010

Climate Change - IPCC AR5

ACCESS Earth System Approach



Summary

POAMA-1.5/2

- Improved land/atmos initialisation + some tuning etc
- New state-of-the-art ocean data assimilation
- New high res atmosphere
- Operational 2006/7
- 25 year comprehensive ensemble hind-cast set
- Direct and downscaled rainfall
- Intra-seasonal component

POAMA-3

- New ACCESS earth system coupled model
- Extension of data assimilation to Full Ensemble Kalman Filter
- Time scale ~2009/10