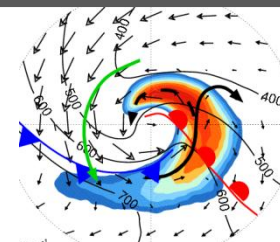




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INTRODUCTION



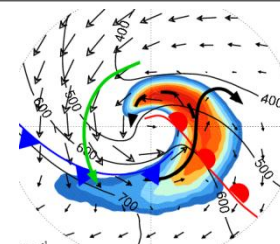
predictability adjustment anchoring balance lifecycles pseudo-stationary
interactions extratropical lows gravity
reduced-order pollution synoptic
systems tracking dynamics convective-scale volcanic variability
tropical-extratropical conditional diabatic
feature-based/pattern processes atmospheric instabilities
theory banding exchange waves secondary
multiscale nonlinear jets tropical sting cyclone weather microphysics
polar extreme systems structures instability jet influence
aspects symmetric
dynamical events cloud
numerical development ash
forecasting precipitation cycles models
recognition stream moisture cyclones
slantwise transport convection
severe fluid orographic convective
parameterization rainfall/flooding
mechanisms dispersion ensemble cycling stratosphere-troposphere

Word
It Out



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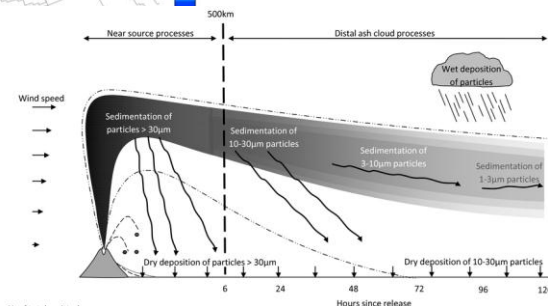
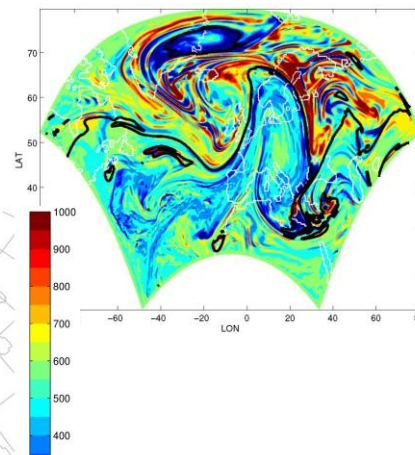
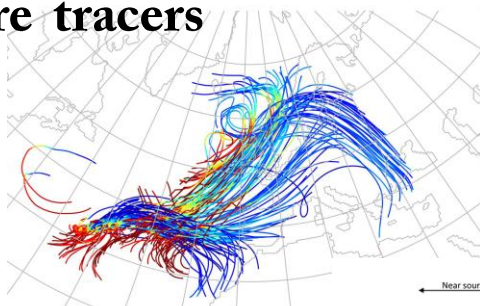
METHODS AND TOOLS



- ✓ Idealised & case-study simulations (MetUM, LEM)
- ✓ Ensemble methods
- ✓ MetUM Tracers

Diabatic PV, theta and moisture tracers

- ✓ Trajectory analysis
- ✓ Sensitivity analysis
- ✓ Dispersion modelling (NAME)
- ✓ SAL methodology (developed by H. Wernli)
- ✓ Reanalysis diagnostic tools
- ✓ Cyclone Tracking and compositing (developed by Kevin Hodges):

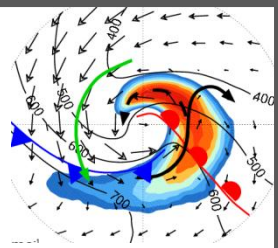


Extratropical Cyclone Atlas

- ✓ Parameterization development

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SENIOR STAFF



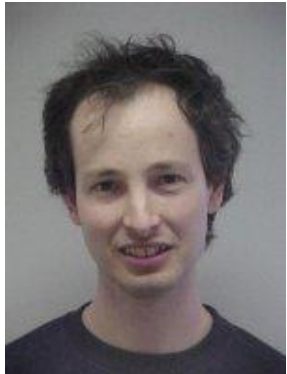
Sue Gray

- Conditional symmetric instability
- Polar lows and tropical cyclones
- Pollution transport
- Synoptic and convective-scale predictability



Helen Dacre

- Development mechanisms of Extratropical cyclones (Extratropical Cyclone Atlas)
- Secondary cyclone dynamics
- Pollution transport
- Volcanic ash dispersion



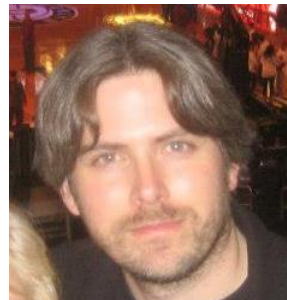
Bob Plant

- Convection -large-scale dynamics interaction
- Convective-scale forecasting
- Stochastic aspects of convection
- Parameterization of convection



Peter Clark

- Deep convection and 'Grey-Zone' parameterization / COPS
- Atmospheric modelling
- Extratropical cyclone structure and sting-jet dynamics.
- Urban-area mesoscale meteorology



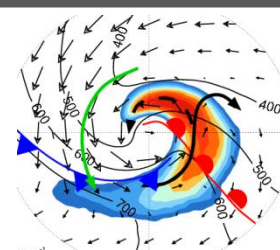
Jeffrey Chagnon

- Gravity and acoustic waves
- Adjustment and balance
- Stratosphere/troposphere exchange



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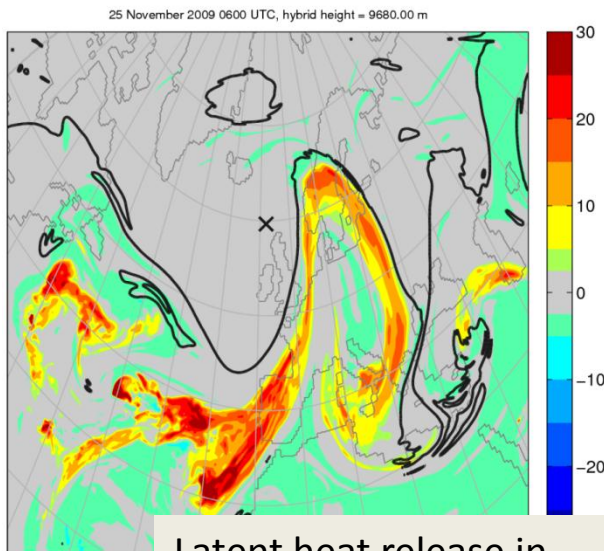
DIABATIC PROCESSES (DIAMET)



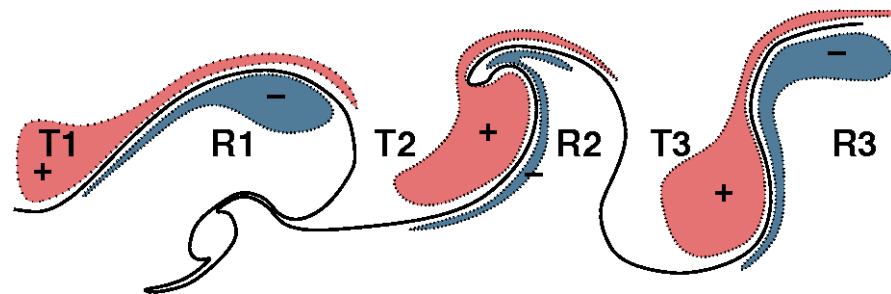
Researchers



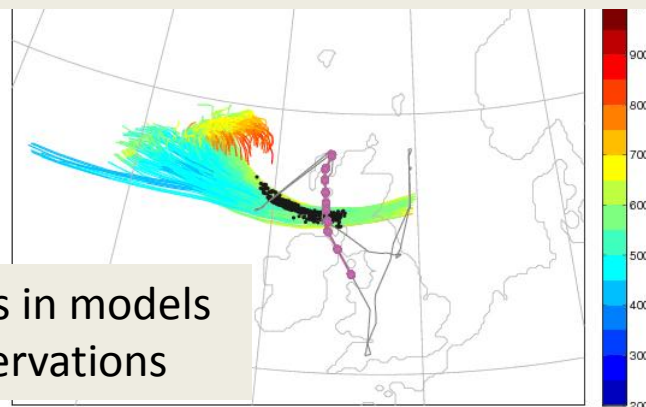
**Oscar
Martinez-Alvarado**



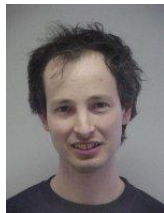
Latent heat release in
the warm conveyor belt



Diabatic PV distribution in an evolving synoptic-scale wave (Chagnon, Gray and Methven 2012)



Sting jets in models
and observations



PIs: Sue Gray, Jeffrey Chagnon, Bob Plant

Others Involved

Laura Baker

John Methven

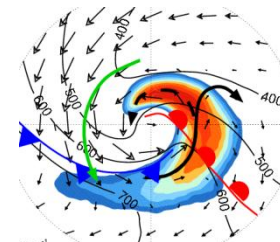
Nigel Roberts (MetOffice@Reading)

Humphrey Lean (MetOffice@Reading)



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MESOSCALE CONVECTIVE SYSTEMS

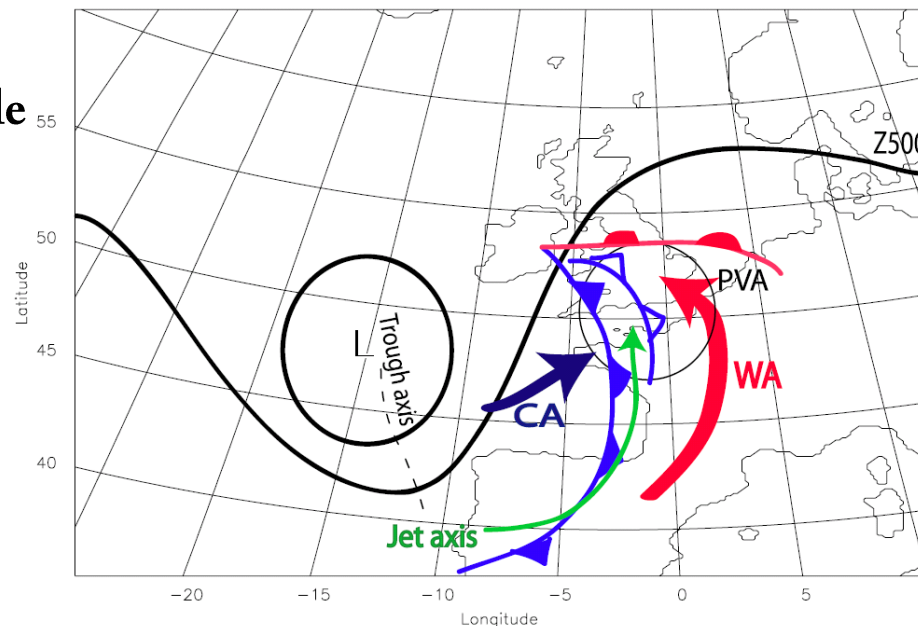


Students



**Samantha
Clarke**

**Multiscale prediction and
upscale impact of mesoscale
convective systems**



Sue Gray

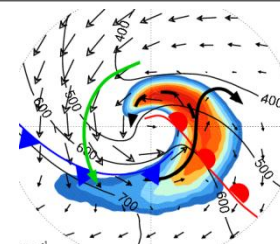
Others involved

Nigel Roberts (MetOffice@Reading)



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ETC MOISTURE PROCESSES

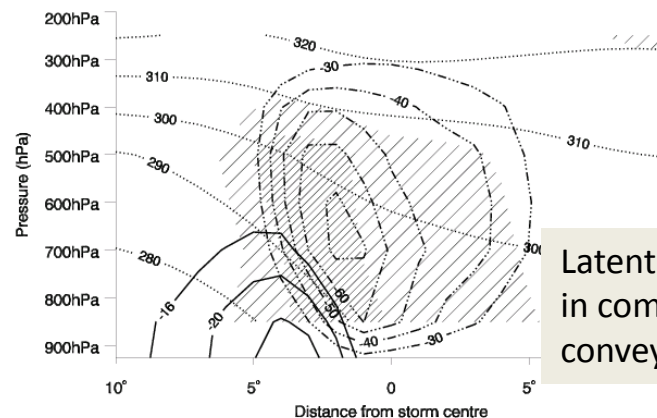


Students



Latent heat release in ETCs in remote sensing data, reanalysis and HiGEM

Matt Hawcroft



Latent heat release in composite warm conveyor belt



Projected changes in extreme European rainfall due to N. Atlantic cyclones

Ruari Rhodes



Helen Dacre



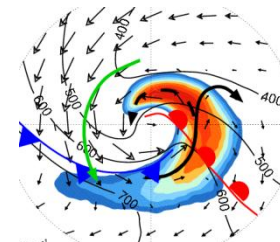
Sue Gray

Others Involved:
Len Shaffery
Kevin Hodges



Mesoscale Group

ETC MOISTURE PROCESSES

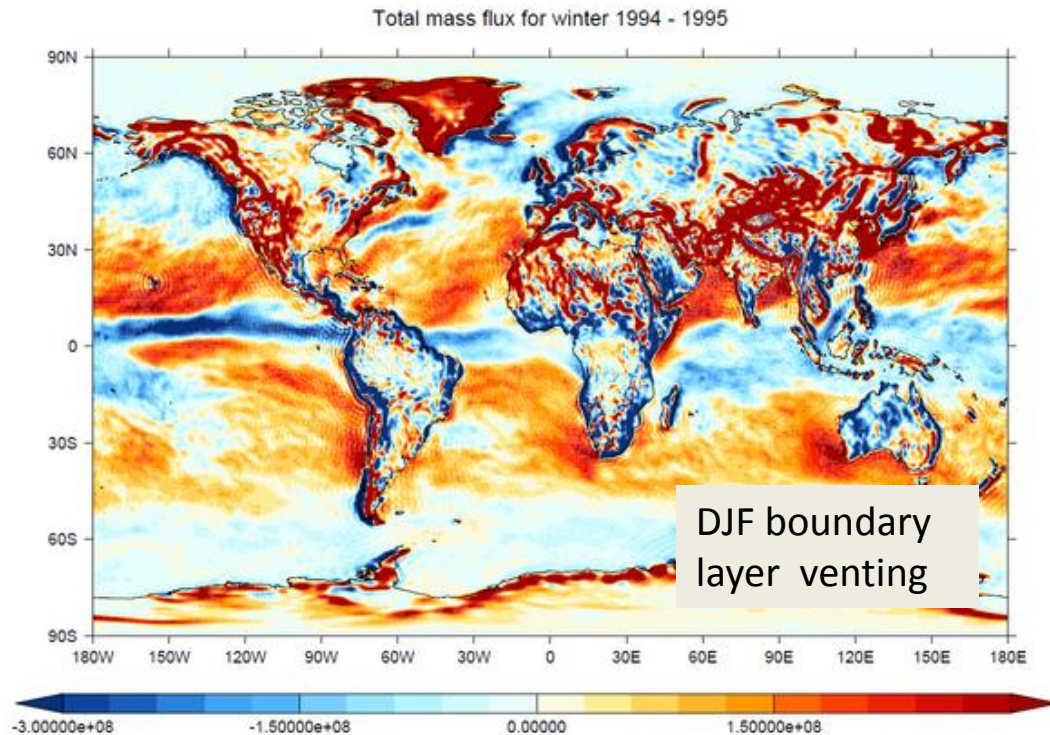


Students



**The moisture
cycle in mid-
latitude weather
systems**

David McNamara



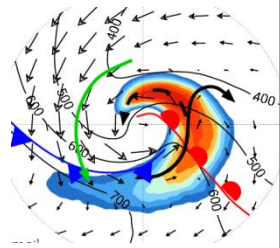
Bob Plant

**Others Involved:
Stephen Belcher**



Mesoscale Group

CONDITIONAL SYMMETRIC INSTABILITY

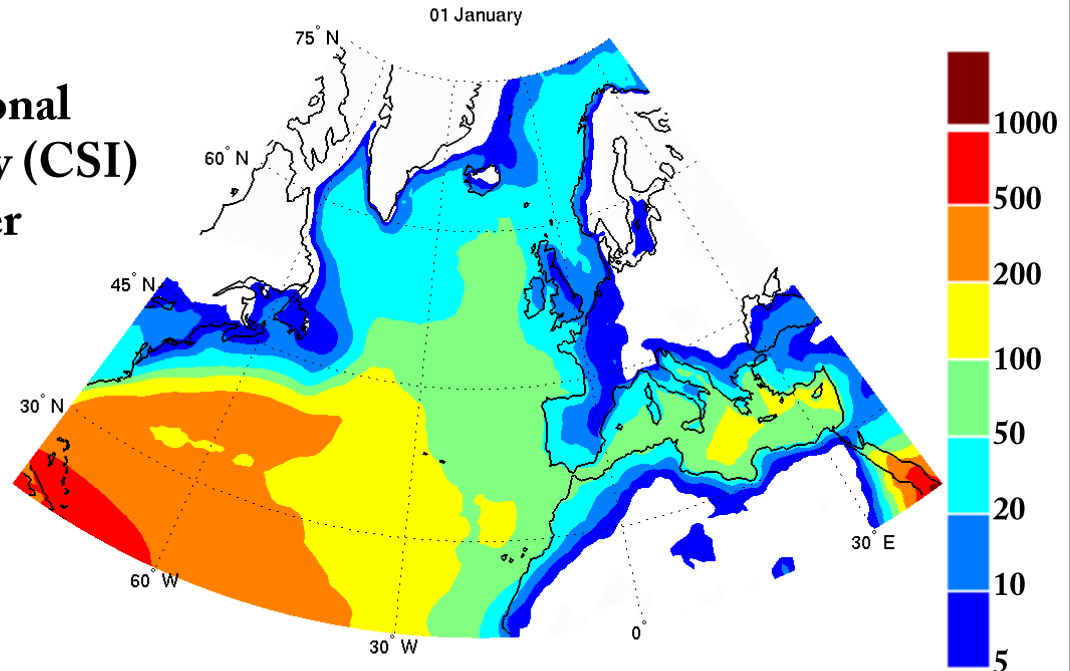


Students



**Michael
Glinton**

**The Role of Conditional
Symmetric Instability (CSI)
in Numerical Weather
Prediction**



ERA-Interim mean SCAPE (J/kg^{-1}) climatology



Sue Gray

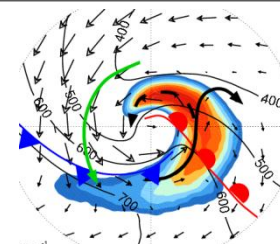


Jeffrey Chagnon



Mesoscale Group

STING JET WINDSTORMS



Researchers



Neil Hart

Sting jet windstorms
in current and future
climates

Students



Aga Mega

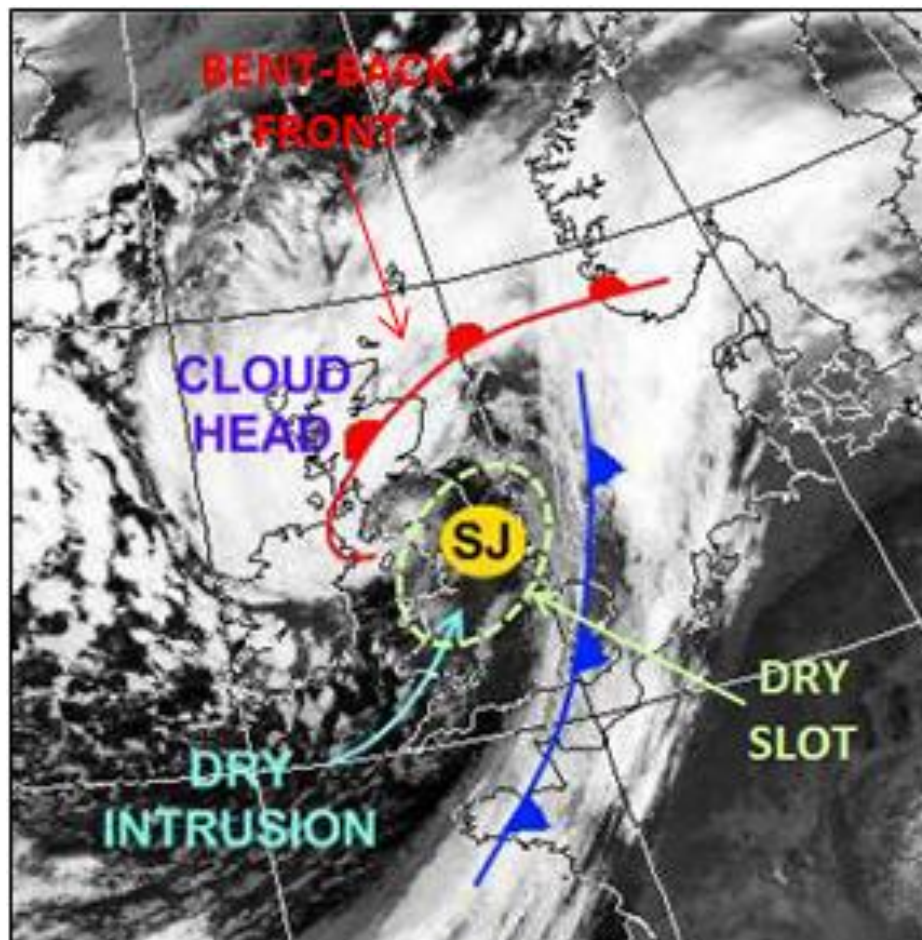
Dynamics of sting
jets and their relation
to large-scale drivers



Peter Clark



Sue Gray

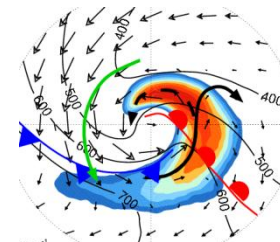


Others Involved:
Laura Baker
Oscar Martínez-Alvarado



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STATIONARY CONVECTIVE SYSTEMS



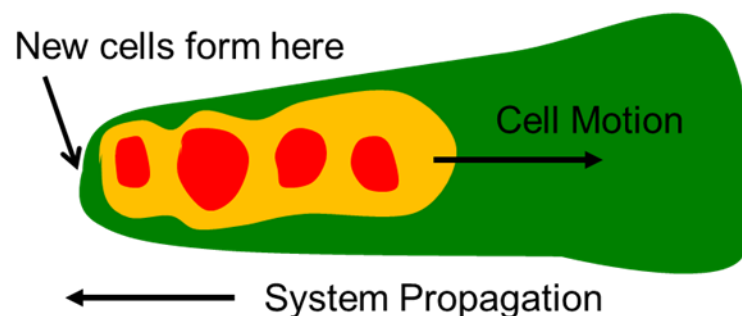
Students



**Rob
Warren**

Quasi-stationary convective systems

- Case study (21 July 2010)
- UK climatology
- Idealised modelling



Adapted from Schumacher and Johnson (2005)



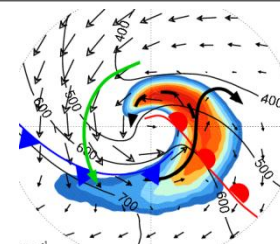
Bob Plant

**Others involved:
Dan Kirshbaum
Humphrey Lean**



Mesoscale Group

OROGRAPHIC RAINBANDS



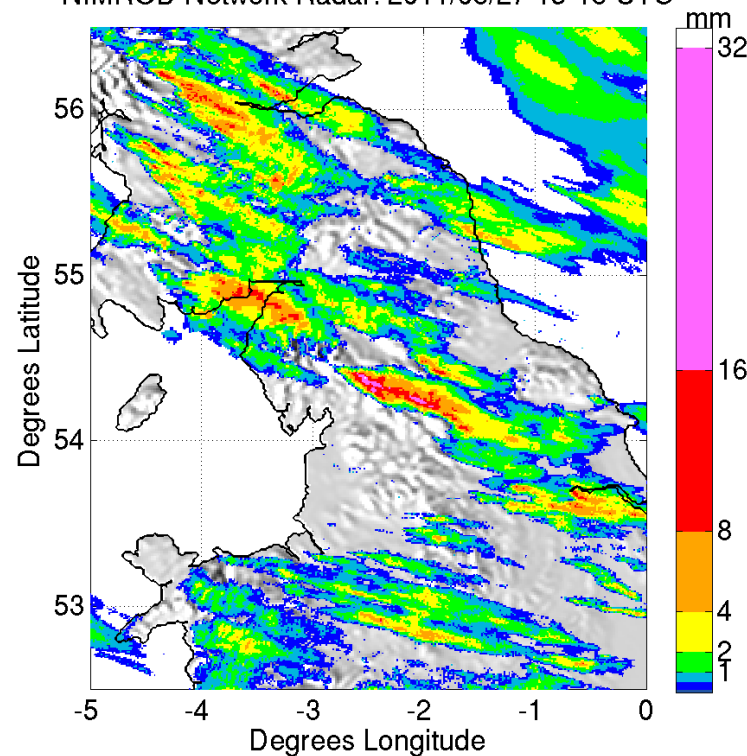
Researchers



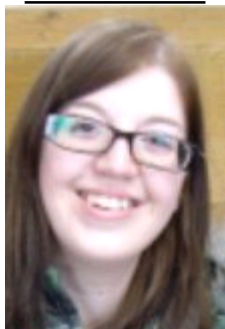
**Andrew
Barrett**

**Mechanisms and
predictability of
stationary convective
rainbands**

NIMROD Network Radar: 2011/08/27 15-18 UTC



Students



**Caroline
Crowther**

**Regimes of banded
convection downwind of
mountains**



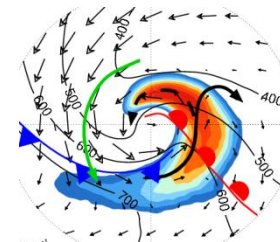
Sue Gray

**Others involved:
Dan Kirshbaum**



Mesoscale Group

SUMMARY



Mesoscale features of extra-tropical cyclones

- Sting jets
- Diabatic processes
- Moist processes

Meeting: Tues, 10am, 1L61
www.met.reading.ac.uk/~mwp

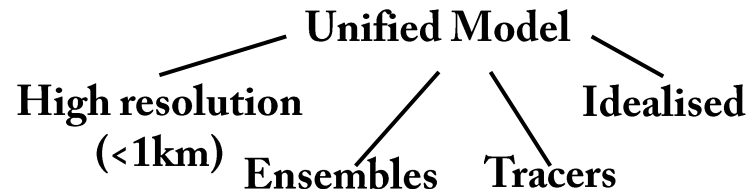


Convection

- Stationary convective systems
- Orographic convective banding
- Parameterization development
- Grey-zone

Climatologies

- SCAPE
- Stationary convection
- Cyclone intensity and features



NAME dispersion modelling

Cyclone tracking and compositing



Extratropical Cyclone Atlas
www.met.reading.ac.uk/~storms