

Peter Lean - Curriculum Vitae

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Personal Statement

I am a postdoc researcher at JPL leading the development of a new system to evaluate regional climate model output using satellite observations. My interests in meteorology started at a young age; at 13 I set up a polar orbiting satellite receiver to view real-time NOAA satellite images. Since then my enthusiasm and skills have continued to grow and my interests have widened. During my PhD I developed a passion for atmospheric predictability across all space and time scales. Working at the Met Office I have been fortunate enough to gain extensive experience in the workings of sophisticated numerical models. I am keen to continue to broaden my experience in new areas of meteorology.

Research Interests

Mesoscale dynamics, cloud microphysics, atmospheric predictability across all time-space scales (particularly mesoscale), NWP model evaluation.

Experience

- 01/10 - present **Postdoctoral Scholar** - Caltech funded
 NASA Jet Propulsion Laboratory
- Leading development of new model evaluation system for regional climate models.
- 11/05 - 01/10 **Research Scientist** - Mesoscale Model Evaluation and Development
 Met Office (United Kingdom)
 For details of current research please see below.
- "Exceeded Expectations"** in 2009 performance review
 Nominated for **Chief Executive's Awards for Excellence**
 Awarded Personal Bonus for achievements in 2008/9
 Promoted in 2007 from JL4 to JL3 grade
- 10/02 - 06/06 **PhD** "Predictability of convective storms over the ocean"
 University of Reading, UK, Joint Centre for Mesoscale Meteorology
 Supervisors: Dr Suzanne Gray, Prof Peter Clark, Dr George Craig
 Examiners: Dr Martin Miller, Prof David Stephenson
- 10/01 - 09/02 **MSc (Distinction)** Weather Climate and Modelling
 University of Reading, UK, Department of Meteorology
 Dissertation: "The Atmospheric Heat Engine" (Supervisor: Prof John Thurn)

- 10/97 - 07/01 **MSci (1st Class hons)** Geophysical Sciences
University of Leeds, UK, Department of Earth Sciences
Dissertation: "Predicting geomagnetic disturbances using ACE data"
Awarded Versey Prize for best dissertation in Earth Sciences
Awarded Departmental Prize for highest overall mark in Earth Sciences
- Included 1-year:
University of California at Santa Barbara (10/99- 06/00)
GPA 4.0
NEMO II Research cruise (R/V Melville) with Scripps to Galapagos Rift Zone on East Pacific Rise
- 06/97 **A-levels (all grade A)** in Mathematics, Physics, Design and Technology

Summary of my recent research

Model Evaluation

- Developing an end-to-end tool to compare model output against data from a satellite observations database to improve understanding of model strengths/weaknesses
- Representation of Subsidence Inversions in NWP models
- Assessment of performance of Unified Model forecasts of inversions over stratocumulus zones using VOCALS field campaign data
- Investigations of sensitivity to vertical resolution with aim of defining target resolution for operational model

CloudNet

- Involvement with CloudNet collaboration to evaluate the cloud and microphysics formulation of Unified Model using radar and lidar data

High resolution NWP work

- Extensively involved with implementation of new 1.5km variable resolution UK model
- Feature based verification of extra-tropical cyclones using objective cyclone tracking algorithm. Identified consistent over-deepening of extra-tropical cyclones in operational Unified Model LAMs

Model Development

- Diagnosed and solved long-standing problem with lateral boundary conditions in the Unified Model. By imposing balance in the vertical momentum equation, limited area configurations of UM can now be run on a different vertical grid to that of driving model without any adverse effects -allowing enhanced boundary layer resolution in UK forecast model.

Predictability

- Designed and developed new site-specific probability of precipitation nowcast consumer product (currently under product development)

Other relevant training

- ECMWF training courses:
 - Numerical Methods (2006)
 - Parameterisation of Physical Processes (2006)
 - Annual Seminar: parameterisation of physical processes (2008)
- Mediterranean School on Mesoscale Meteorology, Algherro, Sardinia (2004)

IT Skills

- Linux/UNIX
- FORTRAN
- C++ (object-oriented programming)
- Shell scripting
- Python: including experience with numpy, scipy, matplotlib, PyNIO and PyNGL libraries
- IDL: a particular strength (my model forecast graphics are now in extensive use throughout the Met Office)
- Matlab
- LaTeX
- Web development: HTML/PHP/JavaScript/CSS
- MySQL database
- PowerPoint, Excel

Publications

Lean, P. and Wilson, C. (2008) "[Formulation of a balanced Exner pressure in the Lateral Boundary Conditions of the Unified Model](#)", *Met Office NWP Technical Report*, 514.

Lean, P. (2006) "[Predictability of convective storms over the ocean](#)", *PhD Thesis*, Department of Meteorology, University of Reading, UK.

Lean, P., Clark, P., Gray, S. (2005) "[Quantifying error growth during convective initiation in a mesoscale model](#)", *WSN05 World Weather Research Programme Symposium on nowcasting and very short range forecasting*, Toulouse, France.

Lean, P. (2002) "The atmospheric heat engine". *MSc dissertation*, Department of Meteorology, University of Reading, UK.

Lean, P. (2001) "Predicting geomagnetic disturbances using ACE data", *MSci dissertation*, University of Leeds, UK.

Other Interests

Website Development: <http://www.tresco360.co.uk/>

Marathon completed (2005) in 3h50 (under strong gradient winds in intense frontal zone - possibly including slantwise convection). Took place on island of Tresco, Isles of Scilly (involved 7 laps of this small island in the Atlantic Ocean).