Douglas Kelley

Re: Land Surface Modeller (RC221088)

CV - Summary

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Academic qualifications

PhD Climate Change Ecology

2014

Macquarie University, Department of Biological Sciences, Ryde, NSW, Australia

Thesis: Modelling Australian fire regimes

MSc Earth System Science

2008

University of Bristol, Department of Earth Sciences, UK

BSc (Hons.) Physics

2007

University of Warwick, Department of Physics, UK

Recent Employment History

Postdoctoral Research Assistant

Apr 2015-present

Department of Geography & Environmental Science, University of Reading, UK

Postdoctoral Research Assistant

Jun 2014-Mar 2015

Department of Biological Sciences, Macquarie University, Ryde, NSW, Australia

Publications

Total Citations: 202 H index: 6 i10 index: 5

Examples of Awards won

Macquarie University Research Excellence Scholarship

2010-2014

Macquarie University, Ryde, NSW, Australia

Postgraduate Research Fund (PGRF)

2013

Macquarie University, Ryde, NSW, Australia

Skills

Programming

- Fortran
- C++
- C
- R
- Python
- Matlab
- Shell

See examples at github.com/douglask3 and bitbucket.org/douglask3

Web Design & Publishing

- html
- CSS
- PHP
- Markdown
- Python/R for web-page generation
- Wordpress
- Concrete5
- Latex
- Illustrator
- Photoshop
- GIMP
- Scribus
- ms/open office

See examples at douglask3.github.io/pages/websites

Software Tool Development

I have developed several software package tools related to my research

See examples at douglask3.github.io/pages/tools

References

Prof. Sandy Harrison

s.p.harrison@reading.ac.uk

Prof. Colin Prentice

c.prentice@imperial.ac.uk

Prof. Belinda Medlyn

b.medlyn@westernsydney.edu.au

Full contact information at end of Extended CV

Douglas Kelley

Re: Land Surface Modeller (RC221088)

Extended CV

Contact Information

- **Name** : Douglas I Kelley
- **Work Address** :
  Department of Geography & Environmental Science
  University of Reading
  Whiteknights
  Reading
  RG6 6AB
  UK
- **Home Address** :
  Flat 40
  18 Oxford Road
  Reading
  Berkshire
  RG1 7LB
  UK
- **Email** : douglas.i.kelley@gmail.com
- **Web** : douglask3.github.io
- **Phone** : +44 (0) 7936 726 819

Academic Qualification

PhD Ecology

Modelling Australian fire regimes

2010-2014

Macquarie University, Department of Biological Sciences, Ryde, NSW, Australia

Using remote sensed, ground-based and experimental data to develop and benchmark the LPX Dynamic Global Vegetation Model (DGVM) to improve the simulation of climate impacts on vegetation-fire interactions. Using this new version of LPX to simulate fire regimes, ecosystem resilience, carbon stocks and vegetative impacts on water resources with changes in climate and CO_2 fertilization over the 21st century in Australia.

Thesis can be downloaded from www.goo.gl/9YjwKw

MSc Earth System Science

Main dissertation: Wildfires as part of the global carbon cycle - quantitative analysis using data assimilation

2007-2008

University of Bristol, Department of Earth Sciences, UK

Subjects covered included:

- Earth System modelling inc. land surface-atmospheric interactions, atomospheric physics and ocean modelling
- Remote sensing & GIS
- Ecosystem services
- Extreme weather and natural hazards
- Isotopes and other Earth System tracers
- Climate change science and policy

BSc (Hons.) Physics

Main dissertation: Modelling atmospheric effects on starlight

2002-2007

University of Warwick, Department of Physics, UK

Employment History

Postdoctoral Research Assistant

Apr 2015-present

Department of Geography & Environmental Science, University of Reading, UK

Simulating the impacts of future climate change on vegetation-fire interactions using a coupled dynamic global vegetation model (DGVM). Evaluating and benchmarking multiple DGVM outputs for the fireMIP project.

Extended CV

Employment History Continued

Postdoctoral Research Assistant

Oct 2014-Apr 2015

Cafe M Research Group, Department of Biological Sciences, Macquarie University, Ryde, NSW, Australia

Testing the impacts of climate change and fertilisation from elevated CO_2 on vegetation dynamics and vegetative carbon uptake in conceptual phenology and plant carbon allocation models.

Research Assistant

Jun 2014-Oct 2014

Biosphere & Climate Dynamics, Department of Biological Sciences, Macquarie University, Ryde, NSW, Australia

Modelling the impacts of past and future climate change on vegetation dynamics, and its feedback on hydrology and terrestrial carbon stocks.

Research Assistant

Sep 2008-Sep 2010

Department of Geographical Sciences, University of Bristol, UK

Developing a coupled DGVM-fire model and applying the model to: test the effectiveness of different fire management techniques in current and future climates; and simulate paleo-climate vegetation and carbon stocks.

Earth System Science Summer School Coordinator

Apr 2008-Sep 2008

Department of Earth Sciences, University of Bristol, UK

Publicity; lecture and seminar timetabling; finding and organising guest lectures; general admin.

Widening Participation

Sep 2007-Sep 2008

Widening Participation Office, University of Bristol, UK

Working with students in primary and secondary education to encourage university attendance from low socio-economic backgrounds: helping organise & run university open days and campus tours; school presentations and career evenings.

Skills

Statistical Programming

Most of my research involves statistical analysis of large GIS, climate and experimental datasets and model outputs. Collaboration on many of my projects means I am fluent in most widely used statistical programming languages. Most of my work is in either R, Python or Matlab, but I have also performed graphical and statistical analysis using Fortran and C amongst others.

See douglask3.github.io/my_best_plots for examples of R plots from my PhD.

See douglask3.github.io/lpxbenchmarking for an example of statistical benchmarking of model outputs against global raster and site-based datasets.),

See douglask3.github.io/tools for an example of R software packages I have developed.

Vegetation Modelling

I have been lead developer on LPX - a high-complexity coupled Dynamic Vegetation Model - since 2010. LPX has both Fortran and C++ components for fast (relative to it's complexity) computational times. I have recently added a shell and R interface to facilitate parallisation and to allow outputs to be easily analysed and plotted.

See douglask3.github.io/LPX for more information.

Extended CV

Skills Continued

Web Design

In my spare time, I have developed dynamic websites using open source content management system (such as Concrete5 and Wordpress). Also, my personal site is on a static host, but is maintained using a Python based dynamic-site emulator. Developing and maintaining these sites has allowed me to become familiar with many web design software packages and fluent in HTML/CSS, PHP and Markdown. I have also linked Markdown and html with R and Python when sharing and presenting results from model development and analysis. In fact, this CV has been made by generating HTML/CSS code using R.

See eppingdac.com.au, an example of a website I have developed using Concrete5 content management system
See douglask3.github.io , an example of a website produced using a simple dynamic-site emulator.

Publishing

As well has publishing papers, I have also written manuals, reports and newsletters using a variety of languages and software products, including (aside from standard office/open office):

- Latex - this includes my thesis, available at www.goo.gl/9YjwKw
- Scribus - my running club newsletter, available at eppingdac.com.au/news-and-views/newsletter
- Photoshop/Illustrator and GIMP (the open source equivalent). See flickr.com/doug_from_the_uk for examples of graphical art and photo "touch ups"/manipulation.

Awards

Macquarie University Research Excellence Scholarship (iMQRES)

2010-2014

Macquarie University, Ryde, NSW, Australia

Postgraduate award for completion of PhD

Postgraduate Research Fund (PGRF)

2013

Macquarie University, Ryde, NSW, Australia

Competitive award to enhance postgraduate research experience. Funded attendance at the 2013 AGU fall conference in order to present DGVM development and future projection of terrestrial carbon stocks under climate change

Biology Postgraduate Conference Best Presentation

2011

Biological Sciences, Macquarie University, Ryde, NSW, Australia

Best presentation out of the departments 78 postgraduate students at the annual postgraduate conference. Awarded for presentation on a vegetation model benchmarking system

Workshops and Consultancy Visits

Using Plant Functional Traits to Predict Ecosystem Vulnerability to Changing Fire Regimes

Australian Centre for Ecological Analysis and Synthesis (ACEAS)

Oct 2013

University of Queensland, Brisbane, QL, Australia

Data Synthesis workshop for fire resilience and response analysis

Fire Response Traits Database

May 2013

Macquarie University, Ryde, Australia

Workshop on construction of a database describing distribution of different resprouting traits in climate space, as part of the Australian Centre for Ecological Analysis and Synthesis (ACEAS) Working group " Using plant functional traits to predict ecosystem vulnerability to changing fire regimes "

Technical Assistance for Climate Change

Oct 2009

Royal Society for the Conservation of Nature, Jordan

Report on Impacts of Future Climate Change on Vegetation, Fire, and Runoff in Jordan

Extended CV

Training Courses

An Introduction to Research Impact
Jun 2016
University of Reading, UK
Understanding & identifying potential impact of research including economic, social and policy, and how to write impact summaries and "pathways to impact" for grant applications.

An Introduction to Unix for HPC
May 2013
eMast/INTERSECT, Macquarie University, Ryde, NSW, Australia
Parallel processing techniques for solving complex computational problems on a HPC platform

Software Carpentry
Feb 2013
Programming philosophy, code structure and version control

Genses2Geoscience: Writing for journals
Aug 2012
Macquarie University, Ryde, NSW, Australia
Drafting and writing journal articles and research proposals

Genses2Geoscience: Database construction using sql
Sep 2011
Macquarie University, Ryde, NSW, Australia
Managing data held in a relational database management system

Genses2Geoscience: Teaching in small groups
Aug 2011
Macquarie University, Ryde, NSW, Australia
Effective questioning, encouraging equal participation, and managing student behaviour.

Planning and Writing Journal Articles
Nov 2009
University of Bristol, UK

Software Tools

I have developed and maintained several software packages related to my research projects or to help organise work flow with collaborators. Some of the most used are:

Model Benchmark Metrics
An R-package containing the metrics and basic statistical models relating to my work on model benchmarking.
See douglask3.github.io/vegetation-model-benchmarking for more information.

Git-based R Project Tracking
Tools for tracking r-projects version controlled by Git.
See douglask3.github.io/git-based-r-project-extras for more information.

LPX
Running, storing, analysing and plotting the LPX-Dynamic Global Vegetation Model.
See douglask3.github.io/lpx-dynamic-global-vegetation-model for more information.

For a more comprehensive list, see douglask3.github.io/pages/tools

Extra-Curricular

Committee Member Responsible For Web-design Communications, and Social Runners
Feb 2011-May 2015
Epping and District Athletics Clubs North Epping, Hornsby, NSW, Australia
Website development (www.eppingdac.com.au); designing, producing and distributing newsletter and e-publicity for local community running and athletics club

Extended CV

Extra-Curricular Continued

RDA Volunteer
Dec 2012 - Feb 2015
RDA - Riding for the Disabled, Ryde, NSW, Australia
Funding raising & publicity; feeding horses

Group Discussion Chair
2011 - 2013
Biosphere & Climate Dynamics, Department of Biological Sciences, Macquarie University, Ryde, NSW, Australia
Organised and chaired group meetings and paper discussions

Outreach Volunteer
2010 - 2011
Genses2Geoscience, Department of Biological Sciences, Macquarie University, Ryde, NSW, Australia
Demonstrated department research during school tours of the University

Demonstrator
2008 - 2009
MSc Earth Systems Science and MSc natural hazards - Modelling the Earth System
Conducted seminar on fire-vegetation modellings and running modelling tutorials

Student Union Involvement
2002-2009
University of Warwick and University of Bristol
Sabbatical year sitting on board of directors of Warwick Students Union, responsible for the Student Advice and Welfare department; 3 years as charity trustee and 6 years on student council responsible for Science Faculty representation; committee posts on various student-run sports clubs and societies including People and Planet, Student TV station , Student Support Groups, and running clubs

Digital Photography: Creating and sharing better images
2010
Open University, UK
Open University undergraduate course in digital photography and image manipulation
See www.flickr.com/photos/doug_from_the_uk

Current Research Interests

My research focuses on improving our understanding of the impacts of future climate change on terrestrial biosphere dynamics, such as ecosystem vegetative composition and resilience, disturbance regimes, carbon stocks and hydrological cycles. Much of this involves utilising satellite and ground-based data for more observation-driven model development and model benchmarking in an effort to better constrain simulations of climate and vegetative controls on disturbance regimes. I am also involved in projects that explore plant resource allocation, phenology and drought recovery strategies.
My current research projects include:

Development of the LPX Dynamic Vegetation Model
douglask3.github.io/lpx-dynamic-global-vegetation-model
Much of my thesis focussed on the assessment and development of the LPX-DGVM model to better represent climate-vegetation-fire dynamics. Continued development strands include:

- Using LPX to aid predictions of the impacts of future climate change on ecosystem resilience, carbon cycle, hydrology & drought, and disturbance regimes
- Improving model performance for forest ecosystems
- Continued development of disturbance resilience and resistance traits - e.g. resprouting after fire and drought.

Extended CV

Current Research Interests Continued

Vegetation Model Benchmarking and Inter-comparison

douglask3.github.io/vegetation-model-inter-comparison-benchmarking

I am the main developer and maintainer of the most widely used vegetation-model benchmarking system, which qualitatively assesses model performance for a variety of land surface processes. Current work includes:

- Incorporation of hydrology and carbon stocks observations
- Model inter-comparisons for the fireMIP project
- R software package development

Vegetation Disturbance Resistance and Recovery Databases

douglask3.github.io/traits-for-resistance-and-recovery-to-disturbance

I have been one of the lead collaborators on compiling several databases describing site based disturbance resistance and recovery traits across plant species, disturbance regimes and climate gradients. These databases are designed to aid vegetation trait development in vegetation models. These traits include:

- Resprouting as a recovery to drought and fire disturbance.
- Bark thickness as protection against fire.

Plant Resource Allocation Strategies

More recently, I have become involved in research projects exploring wider vegetation dynamics and responses to environmental change, including:

- The testing of conceptual carbon allocation strategies in a vegetation model framework, and the response of these strategies to changing climate and increasing CO_2 fertilization.
- Development of a simple dry-season phenology model for tropical grass and woodland ecosystems.

For more detail on all these projects, see douglask3.github.io/pages/research-interests

References

Prof. Sandy Harrison

Professor in Global Paleoclimates and Biogeochemical Cycles

Email: s.p.harrison@reading.ac.uk

Department of Geography and Environmental Science
School of Archaeology, Geography and Environmental Science
The University of Reading
Whiteknights
Reading
RG6 6AB
UK

Prof. Iain Colin Prentice

Chair of Biosphere and Climate Impacts

Email: c.prentice@imperial.ac.uk

Grantham Institute for Climate Change and Department of Life Sciences
Imperial College
Silwood Park Campus
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SL5 7PY
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Extended CV

References Continued

Prof. Belinda Medlyn

Climate and Forest Ecosystem Modelling

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