**CEH Appraisal 2016-17**

**(Shaded boxes = FJP)**

**DO NOT ADD, DELETE OR ALTER THE TABLES IN THIS FORM**

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| **Name:** | Douglas Kelley | | | | | |
| **Section:** | Reynard | | | | | |
| **Version:** | 01/04/2016 – 31/03/2017 | | | | | |
| **Main appraiser:** | | | Rich Ellis | | | |
| **Countersigner:** | | | Douglas Clarke | | | |
| **Other appraiser(s) e.g. project leader (if any):** | | | | Eleanor Blyth | | |
| **Date created:** | | 24/08/16 | | | **Appraisal meeting date:** | 24/08/16 |

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| **Job Title**: | Land Surface Modeller | **Band:** | 6 |

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| **What is the key purpose of your role?** *(How does my work contribute? What is the aim of my role)* |
| Understand & quantify land surface feedbacks within the Earth System |

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| **What resources are available to you?** *(e.g. equipment, budget, line & project managed staff)* |
| HPC access |

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| **Please list the main duties of your role** *(These are your key responsibilities. Your core duties are pre-entered)* |
| 1. To meet NERC core expectations as appropriate to my role, particularly:    * play a full part in the effective operation of the appraisal system    * meet the health & safety responsibilities of my role (ref CEH H&S Policy Statement)    * maintain & develop my knowledge & skills    * manage my team in accordance with the expectations in the CEH manager's framework and checklist.    * work respectfully and positively with colleagues, customers and stakeholders |
| * Running and analysis of the performance of the land surface model (JULES) within the UK Earth System Model (UKESM). * Liaise with modellers at the Met Office in Exeter to ensure any new model-code works within the larger framework of the Unified Model. * Work with the team at CEH to trial and evaluate new model developments. * Model evaluation and analysis/ * Design and implement applications of UKESM * Paper writing and presentation of results at international scientific meetings |

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**Objectives**

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| *A maximum of 6 SMART Objectives is recommended but extra objects can be added, if required.*  *Objectives are the targets you set to meet your duties (responsibilities). They should be SMART=****S****pecific,* ***M****easurable,* ***A****chievable,* ***R****elevant,* ***T****imebound.*  *First 7 boxes (shaded area above the dark line) for each Objective to be completed for forward job planning (FJP).*  *Final 4 boxes (not shaded & below the dark line) for each Objective to be completed when your performance is being assessed. This can be at any stage during the year but all will need to be completed for the end of year appraisal by you (the appraisee), by the main appraiser (your line manager) and, if required, by other appraisers (e.g. project manager).* |

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| **SMART Objective 1 name** | | | |
| **Development support for modelling land surface processes in the UKESM** | | | |
| **Details** | | | |
| UKESM version 1 is due to be completed by May 2017, and the first stage for development support is to work with the UKEMS core team to assess and fix outstanding issues with the coupling of the land surface component. This will mostly involve re- paramterisations and sensitivity testing rather than scientific development, and will include:   * Carbon conservation and evaluation of CO2 in emission-driven runs (October-November) * Surface albedo tuning (see <https://code.metoffice.gov.uk/>) (October – December) * Model component carbon uptake e.g. using a CO2 perturbation in a spun-up run to evaluate carbon uptakes in Land/ocean (December - January) * Implementing a scientifically testing diffuse fraction code (January - February) * Understanding and improving biases in vegetation fractions which affect the rest of the ESM. For example, bare soil fraction likely to be a problem for dust and other components. (Perhaps for version 2, see below) * Any other outstanding issues that become apparent to the core team   Once this has been completed, I will be providing support for CMIP6 (and associated MIP) simulations. This will be followed by development of UKEMS version 1.x/2. Exact areas for development will depend largely on the needs of the core team, outstanding development areas from version 1, and model evaluation (see objective 2), but may well include:   * Fire-atmosphere coupling (e.g., GHG/aerosols/VOC emissions and albedo - see objective 3) * Vegetation establishment time. | | | |
| **Target date:** | UKESMv1: May 2017 | **% Time** : | **25** |
| **Project leader (optional)** : |  | | |
| **Success criteria (optional):** | Successful implementation of UKESM version 1  Initial plan for the next stage of development | | |
| **Next review date (optional):** |  | | |
| **Date achieved:** |  | | |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **SMART Objective 2 name** | | | |
| **Assessment of land surface processes and their impacts on the performance of the UKESM** | | | |
| **Details** | | | |
| UKESM will need an assessment protocol to evaluate model performance against observations. This will help justify model use, quantify uncertainties when applying the model (see Objective 4) and help target development for UKESM2 (Objective 1). At the same time, there is a requirement to update the JULES offline benchmarking protocol.  Evaluation system for the land surface component and land-atmosphere feedback will probably combine iLAMB, a land-surface benchmarking system, and ESMValTool, an evaluation tool for Earth System Models. There is also the possibility of using observations from the Obs4MIPS project, and site based observations from e.g. fluxnet. The protocol should prioritise datasets that are closely linked to a model process and contain more “real information” (i.e. minimal model input).  Evaluation of land-surface processes could be performed in 3 stages:   * *“land-only” runs* (i.e. off-line Jules) to control for uncertainty associated with other components of UKESM. This will allow also enable collection of extra output and examination of parameter space etc. without performing computationally expensive full model runs. This will also help attribute errors in model performance when evaluating coupled runs. Additional benchmark studies with offline runs could include:   + Decoupling individual JULES components for direct process assessment.   + Inputs form different observational sources to test uncertainty associated with observations of climate/land/soil properties etc. * *HadGEM climatology* would allow test of ESM coupling, controlling for boundary conditions * *Full coupled*  to assess overall performance of the model. | | | |
| **Target date:** | |  |  | | --- | --- | | Identify processes/datasets | Apr 2017 | | Choose & obtain/code metrics | May 2017 | | Model experiment design | Jun 2016 | | **% Time** : | 25 |
| **Project leader (optional)** : |  | | |
| **Success criteria (optional):** | Design of a benchmarking protocol  Plan for performing model evaluation. | | |
| **Next review date (optional):** |  | | |
| **Date achieved:** |  | | |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **SMART Objective 3 name** | | | |
| **Fire in the Earth System Model** | | | |
| **Details** | | | |
| Fire has a number of important feedbacks in the Earth System. GHG/aerosols emissions and changes in surface albedo directly affect radiative forcing, whilst vegetation responses to fire also affect the ability of the land surface re-absorb lost carbon, and impact on heat and water fluxes. In many parts of the world, future changes in fire regime could cause substantial and rapid shifts in vegetation and land surface composition. A better understanding of potential changes to fire regimes is therefore essential in order to assess feedbacks to the Earth System and localised impacts of climate change on ecosystem composition and services.  Diagnostic fire has been included in JULES, but is missing many key anthropogenic effects on fire, does not include vegetation impacts and has not been couple to the UKESM.  I have already began work on a simple framework which uses remote sensed observations to assess natural and anthropogenic controls on fire (LimFIRE). This will be expanded to aid development of fire impacts within JULES and parametrization of feedbacks for UKESM in collaboration with colleagues already working on fire within JULES.   |  |  | | --- | --- | | **LimFIRE** | **JULES/UKESM** | | Complete burnt area assessment in LimFIRE | Process evaluation of fire simulation in JULES  Incorporation of anthropogenic fire suppression on burnt area | | Incorporation of other relevant aspects of fire regime (intensity, return rates and residence times) into LimFIRE | Parametrization of vegetation mortality and associated carbon fluxes  UKESM coupling | | Assess the impact of land cover change on fire regime | Assess impact of resultant fire regime change on Earth System coupling | | | | |
| **Target date:** | |  |  | | --- | --- | | LimFIRE Burnt Area | Feb 2017 | | LimFIRE fire regimes | Jun 2018 | | INFERNO anthropogenic supression | Jun 2018 | | UKESM coupling | End of 2018 | | **% Time** : | **15** |
| **Project leader (optional)** : |  | | |
| **Success criteria (optional):** | Submission for publication:   * LimFIRE landuse effects on burnt area (as lead author) * LimFIRE fire regimes * INFERNO fire regimes (as co-author, by end of 2017) * JULES land use impacts on fire (as co-author, by end of 2017/ early 2018) | | |
| **Next review date (optional):** |  | | |
| **Date achieved:** |  | | |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **SMART Objective 4 name** | | | |
| **Applications of UKESM** | | | |
| **Details** | | | |
| Applications could take advantage of the wealth of MIP outputs UKESM is already committed to producing. There will also be the opportunity to perform additional land-only/HadGEM driven experiments, or to use MIP ensembles thereby incorporating outputs from other climate models.  An initial application is to explore Tropical couplings within UKESM:   * Land atmosphere coupling steength * Land – Land teleconnections * <<look in book>>   Additional applications could take advantage to research strands of other JULES users/developers that could be expanded to explore Earth System impacts and/or future environmental change. These include:   * State-space trajectories of draught indices, including present day and future attribution between anthropogenic climate change, land use change and natural variations (Toby) * Coupling to associated bioclimate impacts (Flood risk, air quality, disease spread) * Mortality attribution & Amazon Tipping points (Chantelle Burton. post-fire and UKESM2)   There was also a number of possible Terrestrial application identified by at a recent UKESM users meeting:   * Emergent constraints of perturbation ensambled to assess inter-model connections(Terrestrial UKESM group -could be combined with objective 2 to trace areas of weak model performance introduced with coupling) * Analysis of and changes in extremes | | | |
| **Target date:** | Mid 2017 | **% Time** : | 25 |
| **Project leader (optional)** : |  | | |
| **Success criteria (optional):** | A list of UKESM science applications, collaborates and timetables. | | |
| **Next review date (optional):** |  | | |
| **Date achieved:** |  | | |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **SMART Objective 5 name** | | | |
| **Maintain external collaborations and complete outstanding projects** | | | |
| **Details** | | | |
| There are a number of projects I am working on from my time before CEH which may provide useful to other group members.   * **Phendulum:** A first principles model for describing tropical grassland phenology. At the moment, Phendulum is designed for dry season phenology, but will be expanded include light and temperature driven phrenological drivers, which could be used by others in the group to aid diagnosing automate assignment of changes in cover at COSMOS sites. * **FireMIP benchmarking:** I am performing benchmarking of coupled vegetation-fire models fir the fireMIP project. Involvement in this project may prove useful for work on UKESM model evaluation (objective 2) and fire development (objective 3). * **Impact of future changes in ET on Hydrology:** A project exploring the potential impact of CO2 fertilization on ET-driven changes in runoff for agricultural areas of Australia. This is almost complete with the final paper in review. * **Modelling Australian Fire regimes:** Exploring drivers of potential changes in Australian fire regimes over the 21st century. This is almost complete with the final paper in review. | | | |
| **Target date:** | |  |  | | --- | --- | | Phendulum in Australian Savannah | Mar 2017 | | Phendulum with light/temp drivers | Dec 2017 | | FireMIP initial benchmarking | **Done** | | FireMIP benchmarking paper | Mar 2017 | | FireMIP model process evaluation (including INFERNO) | Sep 2017 | | ET impact on Hydrology | **Done** | | Australian fire | Dec 2016 | | **% Time** : | 10 |
| **Project leader (optional)** : |  | | |
| **Success criteria (optional):** | ET/Australian fire: Published papers  Phendulum: Submitted paper for Australian Savannah  FireMIP: Submitted paper | | |
| **Next review date (optional):** |  | | |
| **Date achieved:** |  | | |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **SMART Objective 6 name** | | | |
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| **Details** | | | |
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| **Target date:** |  | **% Time** : |  |
| **Project leader (optional)** : |  | | |
| **Success criteria (optional):** |  | | |
| **Next review date (optional):** |  | | |
| **Date achieved:** |  | | |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| *Include at least one Development Objective - add extra Development Objectives if required.*  *First 4 boxes (shaded area above the dark line) for each Development Objective to be completed for forward job planning (FJP).*  *Final 3 boxes (not shaded & below the dark line) for each Development Objective to be completed when your performance is being assessed. This can be at any stage during the year but all will need to be completed for the end of year appraisal by you (the appraisee), by the appraiser (your line manager) and, if required, by other appraisers (e.g. project manager)* |

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| **Development Objective 1:** | | **Project Management Skills** | |
| **Activity:** | Making Meetings work  …. | | |
| **How will this support a project, team or CEH objective?** | | | |
| I may be required to take the lead on a number of papers and/or projects of Objectives 3 and 4 over the next few year. | | | |
| **Activity to be completed by (date):** | | | June 2017 |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **Development Objective 2:** | | UKESM suite management system training | |
| **Activity:** | Rose/Cylc training(at metoffice) | | |
| **How will this support a project, team or CEH objective?** | | | |
| I am new to the rose and cylc systems used for versioning and running UKESM. I have learnt how to use these for basic tasks (e.g. running pre-defined suites and tracking model setup changes to my own suites), but additional training will help make my workflow much more efficient and traceable, ad will be required to allow me setup up and automate more complicated jobs required for benchmarking and applications (Objectives 2 and 4) i.e, running ensembles etc. | | | |
| **Activity to be completed by (date):** | | | **Jan 2017** |
| **Self-assessment** | | | |
| **Done** | | | |
| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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| **Development Objective 3:** | |  | |
| **Activity:** | Python numpy, matplotlib and iris training (at metoffice) | | |
| **How will this support a project, team or CEH objective?** | | | |
| Analysis of model output within the core group is generally performed using iris, a metoffice in-house python package. Python is also much more appropriate programming language then I have used In the past (i.e R) for the large climate and meteorological datasets produced by UKESM. This course will help me write more efficient python code to analysis UKESM model outputs. | | | |
| **Activity to be completed by (date):** | | | Oct 2017 |
| **Self-assessment** | | | |
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| **Main appraiser assessment** *Completed by main appraiser* | | | |
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| **Other appraiser assessment (optional)** *Completed by other appraiser or their comments inserted by main appraiser* | | | |
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**Self-assessment to be completed before appraisal meeting (bullet points)**

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| *This is your opportunity to note down what you want to talk to your manager about in your appraisal meeting.* |

**What were your main achievements and outputs during the appraisal period?**

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**Overall self-assessment: particular challenges for you during the year, successes & learning points**

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**Please note any headings of any issues or learning and development needs you wish to discuss in the appraisal meeting**

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**Review of personal and role details**

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| *Please note when you reviewed and updated each of the following:* | | |
| **Intranet page reviewed and updated** | **Date:** |  |
| **Intranet CV reviewed and updated** | **Date:** |  |
| **Staff web page reviewed and updated (if you have one)** | **Date:** |  |
| **SSC details reviewed and updated** | **Date:** |  |

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| *When you have completed the following:*   1. *self-assessment on each individual* **Objective** *&* **Development Objective** 2. **Self-assessment** *bullet points* 3. **Review of personal and role details**   *Send your appraisal form to your main appraiser prior to your appraisal meeting.* |

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**Overall appraisal**

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| **Main Appraiser assessment**  *Appraiser to insert overall comments here AFTER the appraisal meeting. They should also have completed assessment of each individual Objective & Development Objective & inserted comments from other appraiser(s) if necessary. Then send to the countersigner and copy to the appraisee* | |
|  | |
| **Date:** | |
| **Countersigner assessment**  *Countersigner to insert overall comments here, then send to the appraisee and copy to their main appraiser* | |
|  | |
| **Date:** | |
| **Appraisee confirmation of receipt** *Insert date, save as ‘Surname First Name Appraisal 16/17’ (e.g. Brown Tom Appraisal 16/17) then email to ‘*CEHAppraisals‘ *– if* *adding final comments please copy the appraisal by email to your main appraiser too.* | **Date:** |
| **Final comments (optional)** | |
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