

# SPECIAL PROJECT PROGRESS REPORT

Progress Reports should be 2 to 10 pages in length, depending on importance of the project. All the following mandatory information needs to be provided.

**Reporting year** 2019

**Project Title:** Using Earth Observations to constrain land-atmosphere interactions

**Computer Project Account:** SPPTDUTR

**Principal Investigator(s):** Emanuel Dutra

**Affiliation:** IDL, University of Lisbon

**Name of ECMWF scientist(s) collaborating to the project** .....  
(if applicable) .....

**Start date of the project:** 01/01/2018

**Expected end date:** 31/12/2020

**Computer resources allocated/used for the current year and the previous one**  
(if applicable)

Please answer for all project resources

|  |          | Previous year |                 | Current year |                |
|--|----------|---------------|-----------------|--------------|----------------|
|  |          | Allocated     | Used            | Allocated    | Used           |
| <b>High Performance Computing Facility</b> | (units)  | 2500000       | 525888<br>(21%) | 2500000      | 156538<br>(6%) |
| <b>Data storage capacity</b>               | (Gbytes) | 4000          | 4128*           | 7000         | 4756*          |

\*Storage has been accounted under project ptearth by default and not spptdutr

## **Summary of project objectives**

Processes occurring at the land surface impact weather and climate variability. We propose that constraining land-atmosphere exchanges using Earth Observations (EO) will enhance current weather forecasts skill of near-surface fields, such as temperature, and improve the realism of present day climate models leading the way to increase climate change projections reliability. The project focus on three main components: (i) development of key processes in the land surface model HTESSEL (ii) use of EO data to constrain model parameters, and (iii) weather forecasts and climate simulations. The computational component includes on a first stage offline simulation of HTESSEL and on a second stage IFS short-range forecasts and EC-EARTH climate simulations.

## **Summary of problems encountered**

No major problems were encountered.

## **Summary of results of the current year**

During the last year the work was focused on diagnosing ERA5 and HTESSEL stand-alone land surface temperature biases using LSA-SAF satellite observations. The work has been focused on Iberia Peninsula. A clear cold biased has been identified during summertime, which has been associated with the vegetation cover and the partition between low and high vegetation. Sensitivity tests have shown that the errors can be attributed to the vegetation cover. Ongoing offline tests with updated vegetation cover (from ESA-CCI land cover and ECOCLIMAP) will provide further insight. This initial work has been integrated in a MSc thesis that will be presented in mid July and a paper is under preparation.

## **List of publications/reports from the project with complete references**

Johannsen F., Dutra E., Ermida S.: Evaluation of skin temperature in ECMWF products. APMG 2019, poster: available online: <http://dx.doi.org/10.13140/RG.2.2.12405.01760>

## **Summary of plans for the continuation of the project**

The ongoing tests of changing vegetation cover over Iberia will be tested in coupled forecasts using nudged experiments (if feasible) or forecast only to assess the impact of these changes in the coupled system. This is expected to be performed during this year. Depending on the results, an extension to other regions with similar issues will be evaluated including coupled forecasts.