IMPROVED MEASURES AND FORECASTS OF SOIL DRYNESS

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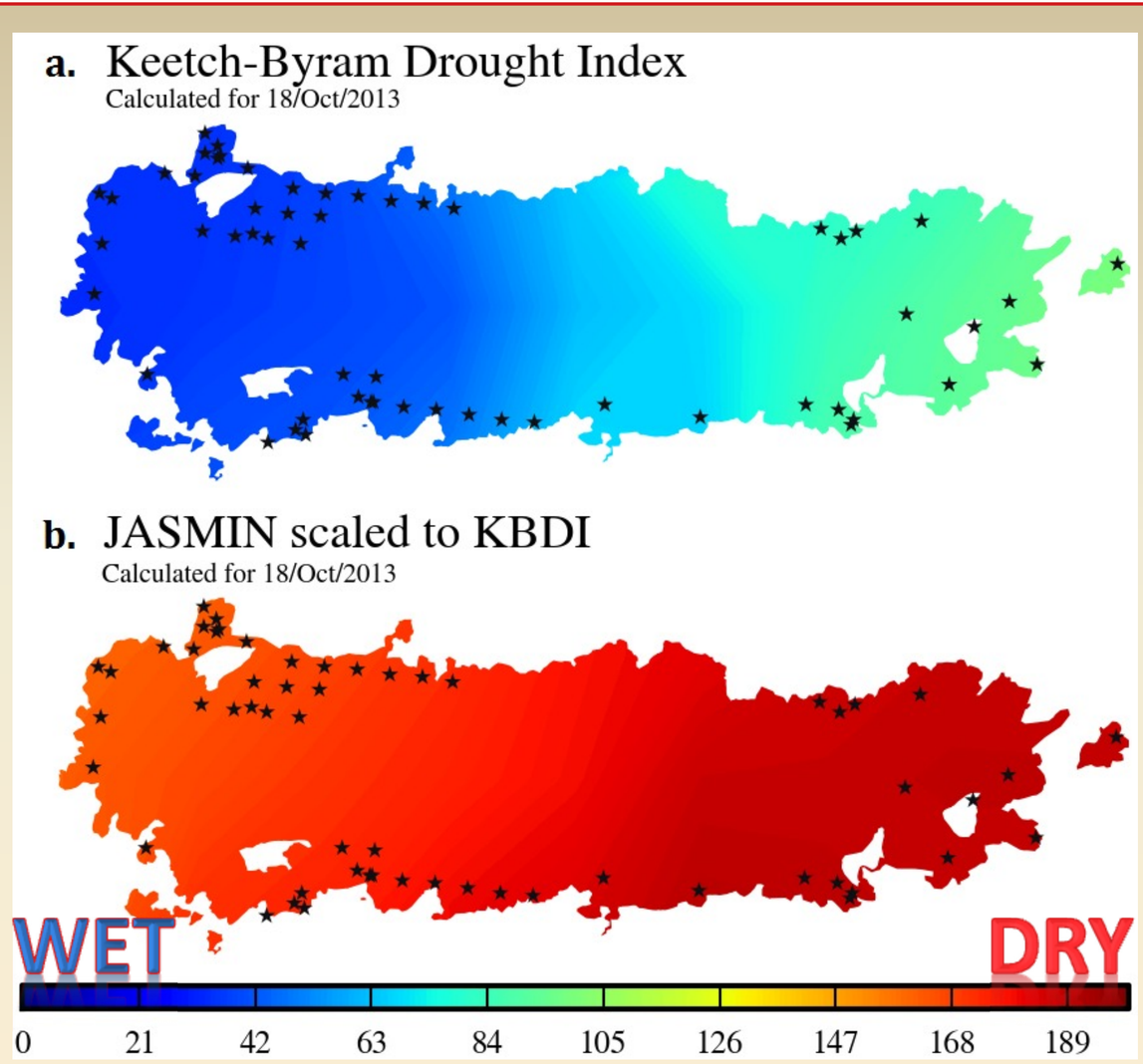
NEW APPROACHES ARE AVAILABLE TO CALCULATE SOIL DRYNESS MORE ACCURATELY THROUGH THE USE OF SATELLITE REMOTE SENSING MEASUREMENTS, LAND SURFACE MODELLING AND DATA ANALYSIS TECHNIQUES.

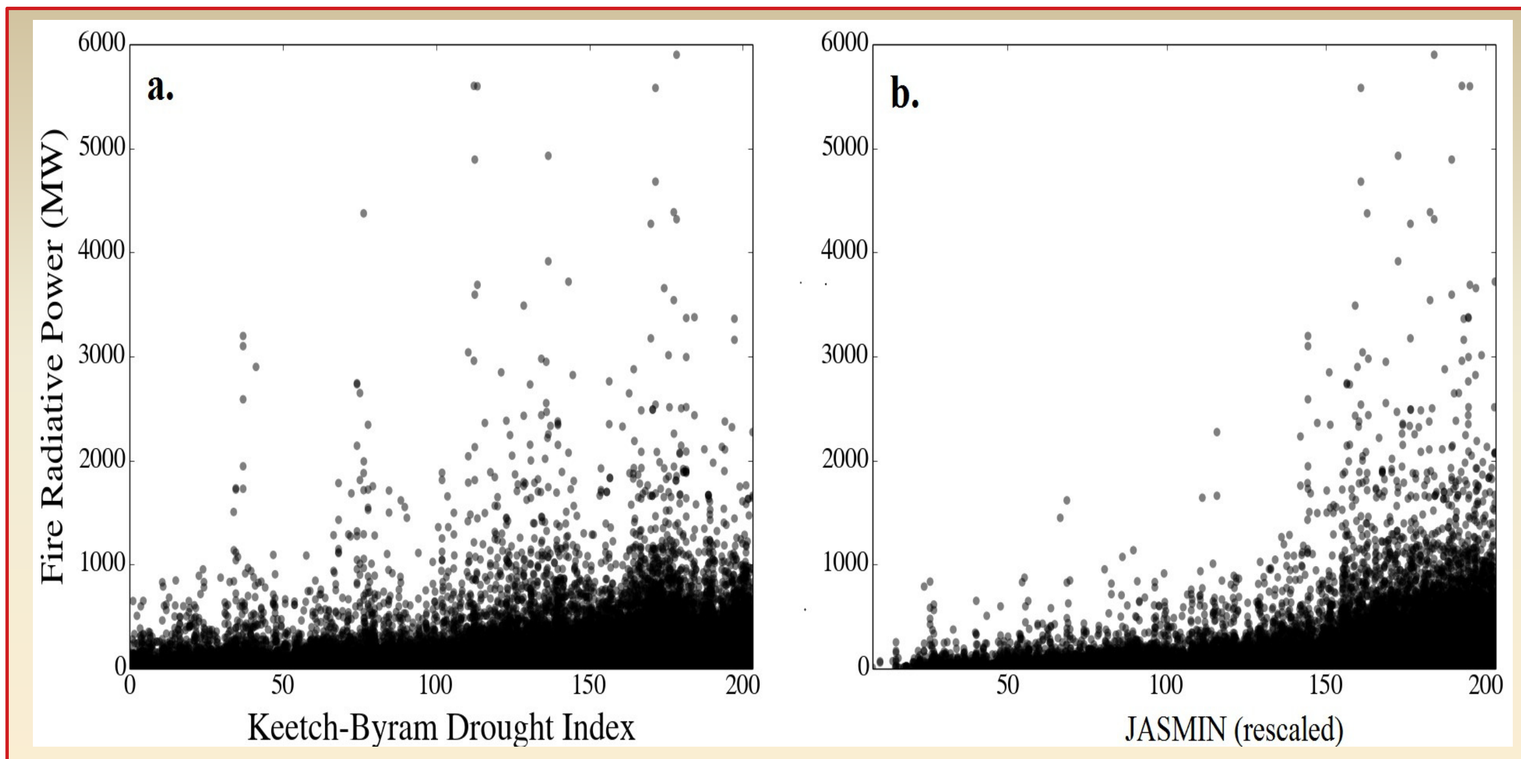
This research has developed a prototype, 5-km resolution, JULES based Australian Soil Moisture Information (JASMIN) system, that is more accurate than the currently used soil dryness indices. JASMIN uses the JULES land surface model together with surface and satellite based observations to improve the monitoring and prediction of soil dryness. The JASMIN outputs will be calibrated for use within existing fire prediction systems. The long-term goal is to integrate the JASMIN outputs into the new National Fire Danger Rating System.

END-USER STATEMENT

The results so far are both encouraging and tantalising. Fire danger forecasting and operational fire-behaviour prediction is limited by the relatively crude soil moisture modelling we commonly use. The availability of the advanced, finescale, multi-layer soil-moisture information arising from this project will be a boon to fire behaviour analysts everywhere in Australia, even though the richer data will be a challenge for us to understand, exploit and communicate. – **Mark Chladil, Fire Management Planning Officer, Tasmania Fire Service**



SOIL DRYNESS FOR THE STATE MINE FIRE, IN NEW SOUTH WALES, 18 OCT 2013, FROM a)THE KEETCH-BYRAM DROUGHT INDEX AND b)RESCALED JASMIN. THE BLACK STARS DEPICT MODIS OBSERVED HOT SPOTS. THE PLOT SHAPE SHOWS THE FINAL FIRE BOUNDARY.



SCATTER PLOT DEPICTING MODIS OBSERVED FIRE RADIATIVE POWER AGAINST SOIL DRYNESS a)KBDI, AND b)RESCALED JASMIN. THE DATA SPANS FROM JAN TO DEC 2013. AUSTRALIA DOMAIN.

KBDI VERSUS JASMIN

One of the cases being studied as part of the evaluation is the State Mine Complex fire, which occurred in New South Wales in October 2013. The JASMIN product is far drier and the KBDI may be significantly under-predicting soil dryness. Verification against in-situ soil moisture observations has shown that KBDI generally has a large wet-bias.

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