Regional climate modeling of heat stress, frost, and water stress events in the agricultural region of Southwest Western Australia under the current climate and future climate scenarios.

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Heat stress, frost, and water stress events have significant impacts on grain quality and production within the agricultural region (wheat-belt) of Southwest Western Australia (SWWA) (Cramb, 2000) and understanding how the frequency and intensity of these events will change in the future is crucial for management purposes. Hence, the Regional Atmospheric Modeling System (Pielke et al, 1992) (RAMS Version 6.0) is used to simulate the past 10 years of the climate of SWWA at a 20 km grid resolution by down-scaling the 6-hourly 1.0 by 1.0 degree National Center for Environmental Prediction Final Analyses from December 1999 to Present. Daily minimum and maximum temperatures, as well as daily rainfall are validated against observations. Simulations of future climate are carried out by down-scaling the Commonwealth Scientific and Industrial Research Organization (CSIRO) Mark 3.5 General Circulation Model (Gordon et al, 2002) for 10 years (2046-2055) under the SRES A2 scenario using the Cubic Conformal Atmospheric Model (CCAM) (McGregor and Dix, 2008). The 6-hourly CCAM output is then downscaled to a 20 km resolution using RAMS. Changes in extreme events are discussed within the context of the continued viability of agriculture in SWWA.


