Geophysical Research Abstracts
Vol. 12, EGU2010-2997, 2010
EGU General Assembly 2010

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.

Jatin Kala (1), Tom J Lyons (1), Deborah J Abbs (2), and Ian J Foster (3)

(1) Murdoch University, School of Environmental Science, WA, Australia (j.kala@murdoch.edu.au), (2) CSIRO Division of Marine and Atmospheric Research, Aspendale, VIC 3195, Australia, (3) Department of Agriculture and Food, Bentley, WA 6102, Australia

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.

Cramb, J. (2000) Climate in relation to agriculture in south-western Australia. In: The Wheat Book (Eds W. K. Anderson and J. R. Garlinge). Bulletin 4443. Department of Agriculture, Western Australia.

Gordon, H. B., Rotstayn, L. D., McGregor, J. L., Dix, M. R., Kowalczyk, E. A., O'Farrell, S. P., Waterman, L. J., Hirst, A. C., Wilson, S. G., Collier, M. A., Watterson, I. G., and Elliott, T. I. (2002). The CSIRO Mk3 Climate System Model [Electronic publication]. Aspendale: CSIRO Atmospheric Research. (CSIRO Atmospheric Research technical paper; no. 60). 130 p

McGregor, J. L., and Dix, M. R., (2008) An updated description of the conformal-cubic atmospheric model. High Resolution Simulation of the Atmosphere and Ocean, Hamilton, K. and Ohfuchi, W., Eds., Springer, 51-76.

Pielke, R. A., Cotton, W. R., Walko, R. L., Tremback, C. J., Lyons, W. A., Grasso, L. D., Nicholls, M. E., Moran, M. D., Wesley, D. A., Lee, T. J., Copeland, J. H., (1992) A comprehensive meteorological modeling system – RAMS. *Meteorol. Atmos. Phys.*, 49, 69–91.