

Impact of change in mean temperature and variability on annual crops

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A warming of mean seasonal temperature under climate change should reduce the yield of annual crops through changes in the rates of crop development, photosynthesis and respiration. Many experiments have quantified the response of annual crops to warmer mean temperatures. However, the pattern of variability in temperature within the growing season may also impact on crop yields under current and future climates. Experiments with wheat, rice and groundnuts have demonstrated the importance of the magnitude of daily maximum temperature at critical stages of crop development to final crop yield. The effect of these extreme temperatures on yield depends on a combination of the temperature, the duration of the stress, the development stage of the crop, and sometimes any previous exposure of the crop to extreme temperatures. Models that aim to simulate crop growth and yield in current or future climates with a high variability in temperature, need to accurately represent the impact of these short-term episodes of extreme temperatures. This provides a challenge to our current range of crop simulation models. The short time-scale of the response also requires a high degree of precision in the predictions of weather. Implications of these challenges for a combined weather and crop forecasting system will be discussed.

Friday II (Talk)