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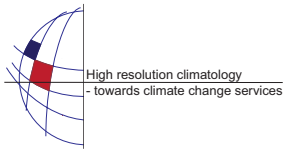

Agricultural pests under future climate conditions: downscaling of regional climate scenarios with a stochastic weather generator

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As a consequence of current and projected climate change in temperate regions of Europe, agricultural pests and diseases are expected to occur more frequently and possibly to extend to previously unaffected regions. Given their economic and ecological relevance, detailed forecasting tools for various pests have been developed, which model the infestation depending on actual weather conditions. Assessing the future risk of pest-related damages therefore requires future weather data at high temporal and spatial resolution. In particular, pest forecast models are often not based on screen temperature and precipitation alone (i.e. the most generally projected climate variables), but might require input variables such as soil temperature, in-canopy net radiation or leaf wetness. Here, we use a stochastic weather and a re-sampling procedure for producing site-specific hourly weather data from regional climate change scenarios for 2050 in Switzerland. The climate change scenarios were derived from multi-model projections and provide probabilistic information on future regional changes in temperature and precipitation. Hourly temperature, precipitation and radiation data were produced by first generating daily weather data for these climate scenarios and then using a nearest neighbor re-sampling approach for creating realistic diurnal cycles. These hourly weather time series were then used for modeling important phases in the lifecycle of codling moth, the major insect pest in apple orchards worldwide. First results indicate a shift in the occurrence and duration of phases relevant for pest disease control for projected as compared to current climate (e.g. the flight of the codling moth starts about ten days earlier in future climate), continuing an already observed trend towards more favorable conditions for this insect during the last 20 years.