*Forecasting the weather
- ensemble techniques
in probabilistic weather prediction*

Sub-seasonal forecasting of agricultural pests in Switzerland

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Given their economic and ecological relevance, detailed forecasting tools for various pests have been developed, which simulate the infestation depending on actual weather conditions. The development of pests is most successfully predicted if the micro-climate of the immediate environment (habitat) of the causative organisms can be simulated. Sub-seasonal pest forecasts therefore require weather information for the pest relevant habitats and on the appropriate time scale (i.e. hourly temporal resolution). The operational pest forecasting system SOPRA (www.sopra.info) currently used in Switzerland takes into account such detailed weather information based on observations up to the day the forecast is issued, but only based on the climatology for the coming weeks.

Here, we aim at improving the skill of these pest forecasts by transforming the weekly information of ECMWF monthly forecasts into hourly weather time series as required for the prediction of upcoming life phases of the codling moth, the major insect pest in apple orchards worldwide. Due to the probabilistic nature of operational monthly forecasts and the limited spatial and temporal resolution, their information needs to be post-processed for use in a pest model, e.g., by a statistical downscaling. An attractive option to downscale highly aggregated probabilistic information to high temporal (and spatial) resolution is the application of a stochastic weather generator (WG). WGs mainly operate at daily time scales. Hourly outputs are less common, but have been realized by applying a re-sampling approach subsequent to the generation of the daily weather series. The application of the stochastic WG/re-sampling procedure for use in pest forecasts, and the required level of detail from the monthly forecasts will be investigated.