Producing useful and relevant drought information: translating drought conditions into agricultural impacts.

Drought is probably the most complex climate-related hazard: it develops slowly and it is hard to estimate the start, spatial extent and duration of a dry event. While drought has severe economic, social and environmental impacts, they are not as evident as those of rapid-onset hazards like hurricanes or floods. To produce useful information such as drought early warnings or inform legal definitions of drought, a major gap is our knowledge of the association between different types of drought (occurring at different times, long and mild events vs. short but intense) and their impacts on important socio-economic sectors. In this seminar, I will discuss approaches to characterizing drought hazard (i.e., various metrics of dry events, recurrence periods) for agricultural production in the Argentine Pampas. Because the historical climate record includes few relevant dry events (particularly if focus is placed on sensitive crop periods), I discuss the use of synthetic weather series simulated by a stochastic generator that builds on software developed by Univ. of Colorado researchers. I then show how synthetic weather series can be linked to biophysical crop models that simulate crop growth and yield. Finally, I show "vulnerability curves" that link simulated yield gaps and two indices of water stress: the ratio between actual and potential evapotranspiration and (b) the proportion of available water in the soil layers explored by crop roots.