

# **The formation of latent instability: a case study from the Convective Storm Initiation Project (CSIP)**

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The measurement campaign of the Convective Storm Initiation Project (CSIP) has been conducted across southern England during the summer of 2005. Its goal is to better understand the mechanisms responsible for the initiation of precipitating convection. The formation of convective storms requires that lower-tropospheric air will become less dense than the air surrounding it when lifted. This condition is called 'latent instability'. Once a lifting process of sufficient magnitude occurs, storms can initiate. Latent instability requires that the air at low levels is moist and warm, while the air above is cold. The parcel method is frequently used to assess the presence of this form of instability: a parcel of air can be lifted and its temperature can be visualized and compared with that of the 'surrounding air' on a thermodynamic diagram. In general, any alterations of 1) the initial parcel temperature or 2) moisture content or 3) the temperature of the air at higher altitudes, will alter the amount of latent (in)stability. Effects on very different scales can affect any of these parameters, including horizontal advection of heat and moisture, vertical motion and diabatic processes. The atmospheric phenomena potentially responsible for those are as diverse as the approach of an upper-tropospheric vorticity anomaly, differences in surface energy fluxes and the effects of orography. A study of relevant processes affecting the temporal change of latent instability has been carried out for one of the cases observed during the CSIP project, the primary goal being to find out which processes are the most important and on which scales those occur.