

## **Proposal for FLUXNET synthesis**

**Title:** Assessing soil moisture – atmosphere feedbacks via Bowen ratio changes during droughts from FLUXNET data

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### **Outline:**

During the European drought in 2003 a quite atypical increase in Bowen ratio (sensible heat / latent heat) was observed at several flux sites in Central Europe. This increase implying an increase in sensible heat and a decrease of moisture supply to the atmosphere was caused to stomata closure and reduced surface evaporation associated with very low soil water content. We hypothesis that these changes in energy supply lead to a positive soil moisture – atmosphere feedback. Based on a modeling exercise Fischer et al. (2007) suggest that such a soil moisture – atmosphere feedback contributed significantly to the persistence of the drought in 2003 in Europe. From climate models it is predicted that the area of intense soil moisture – atmosphere feedbacks is expanding further east (Srenevaratne et al., 2006) under a changing climate potentially leading to more intensive droughts in the future.

With this synthesis activity we aim to use FLUXNET data from Europe during the year 2003 and other years in order to (a) assess the mechanisms of Bowen ratio changes across a gradient from Mediterranean to temperate and even boreal sites within Europe, (b) to evaluate if a drought propagation along this gradient exists and if it is triggered by soil moisture – atmosphere feedbacks, and (c) to apply a continental scale model to quantify the changes in energy supply to the atmosphere and its impacts on atmospheric conditions.

Our initial study areas are European flux sites. We, however, anticipate that similar mechanisms might occur globally and therefore would like to expand our analysis in a second step to other regions in the world.

**Sites involved:** all European sites (Step 1), all sites (Step 2)