

## Supplementary Material

**Fig. S1** - Cross wavelet analyses output between (a) soil respiration (SR) and soil temperature (Temp), (b) SR and sap flow (SF), (c) SF and soil temperature, and (d) SR and soil water content (SWC) at non-defoliated pine from DOY 142 to 228 (May 22<sup>nd</sup> 2010 to August 16<sup>th</sup> 2010). The colour codes for power values are from dark blue (low values) to dark red (high values). Black lines contouring red areas represent the 5% significance level, as calculated *via* 1000 Monte Carlo simulations. The other black lines indicate the cone influence that delimits the region not influenced by edge effects. Since solar radiation drives soil respiration, sap flow and soil temperature, these variables present clear daily patterns and the wavelet analyses show a strong correlation between them (a, b and c). Therefore, no direct causality inferences could be done between this pairs of variables without removing the autocorrelated signal. On the other hand, when the analysed temporal series do not have transient signals or signals whose amplitude do not vary harmonically in time (such as daily SWC variations), power values show low values (d).

