



How lakes influence the local atmospheric circulation (Young Scientist Award Lecture)

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Summer months in southeast of Portugal are hot and dry, an example of Mediterranean climate, Csa classification according Köppen. Measurements of energy and mass (H_2O and CO_2) fluxes were continuously obtained from June to September 2014 from a floating platform in Alqueva reservoir, southeast of Portugal. During this period the temperature gradient between the atmosphere and reservoir presents two opposite behaviors during the daily cycle. It is observed a positive gradient during afternoon, with $4.8^\circ C$ in average for August, and negative during evening and morning, reaching $6.4^\circ C$ in average for August. In this way, a negative sensible heat flux is noticed in afternoon and a lake breeze is developed locally allowing the subsidence of upper layers dry air to reach the surface in the center of the reservoir. Consequently, stable atmospheric conditions are noticed in the afternoon and unstable in the rest of the day. Latent heat is higher also in the afternoon with an average maximum around 18PM (local time). The average daily cycle of CO_2 flux presents negative values during all day, with a maximum uptake by the reservoir in the evening, the period of maxima CO_2 concentration in the atmosphere due to plants respiration. The thermal circulations induced by the presence of the lake are investigated based on near surface atmospheric measurements close to the reservoir and on altitude soundings.