



The importance of overturns for annual methane emissions from lakes

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The dynamics of dissolved methane were measured over a whole year in a small, dimictic lake, which develops an anoxic hypolimnion during summer stratification. We analyze and compare the diffusive methane fluxes from different time periods: the stratified period in summer, the autumn overturn, the winter mixing period, and the period from spring to summer stratification. Changes in the budget of dissolved methane indicate that anoxic conditions in the hypolimnion and overturn periods are key factors for the overall annual methane emissions from lakes. During autumn overturn, most of the stored methane was emitted to the atmosphere, which supports the assumption made in the global estimates and suggest that the oxidation of methane during overturn may differ between lakes. Changes in the amount of methane efflux during overturns may be an important aspect to consider in the assessment of methane emission estimates from lakes on a global scale.