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Nearfield development of the negatively buoyant Rhône River inflow into Lake Geneva as an interflow: suspended particulate matter and associated fluxes.

Violaine Piton, Frédéric Soulignac, Ulrich Lemmin, Graf Benjamin, Htet Kyi Wynn, and Andrew Barry
EPFL, Limnology, ECOL, Lausanne, Switzerland (violaine.piton@epfl.ch)

River inflows have a major influence on lake water quality through their input of sediments, nutrients and contaminants. It is therefore essential to determine their pathways, their mixing with ambient waters and the amount and type of Suspended Particulate Matter (SPM) they carry. Two field campaigns during the stratified period took place in Lake Geneva, Switzerland, in the vicinity of the Rhône River plume, at high and intermediate river discharge. Currents, water and sediment fluxes, temperature, turbidity and particle size distribution were measured along three circular transects located at 400, 800 and 1500 m in front of the river mouth. During the surveys, the lake was thermally stratified, the negatively buoyant Rhône River plume plunged and intruded into the metalimnion as an interflow and flowed out in the streamwise direction. Along the pathway, interflow core velocities, SPM concentrations and volumes of particles progressively decreased with the distance from the mouth (by 2-3 times), while interflow cross sections and plume volume increased by 2-3 times due to entrainment of ambient water. The characteristics of the river outflow determined the characteristics of the interflows: i.e. interflow fluxes and concentrations were the highest at high discharge. Both sediment settling and interflow dilution contributed to the observed decrease of sediment discharge with distance from the mouth. The particle size distribution of the interflow was dominated by fine particles (<32 µm), which were transported up to 1500 m away from the mouth and most likely beyond, while large particles (>62 µm) have almost completely settled out before reaching 1500 m.