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Study of SGD along the French Mediterranean coastline using airborne TIR images and in situ analyses

Pieter van Beek (1), Thomas Stieglitz (2), and Marc Souhaut (1)

(1) LEGOS, OMP/ LAFARA, Toulouse, France, (2) JCU, Townsville, Australia , (3) LEGOS, OMP/ LAFARA, Toulouse, France

Although submarine groundwater discharge (SGD) has been investigated in many places of the world, very few studies were conducted along the French coastline of the Mediterranean Sea. Almost no information is available on the fluxes of water and chemical elements associated with these SGD and on their potential impact on the geochemical cycling and ecosystems of the coastal zones. In this work, we combined the use of airborne thermal infrared (TIR) images with in situ analyses of salinity, temperature, radon and radium isotopes to study SGD at various sites along the French Mediterranean coastline and in coastal lagoons. These analyses allowed us to detect SGD sites and to quantify SGD fluxes (that include both the fluxes of fresh groundwater and recirculated seawater). In particular, we will show how the Ra isotopes determined in the La Palme lagoon were used to estimate i) the residence time of waters in the lagoon and ii) SGD fluxes.