



## **Understanding the influence of land use and geology on hydrochemistry and hydrodynamic of Salburua wetland (Isotope techniques).**

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Salburua wetland is located within a vulnerable zone in Alava province (Basque Country) in a quaternary aquifer/aquitard composed by alluvial deposits (mostly clayey materials). Salburua is one of the most important continental wetland in the Basque Country; in 2002 Salburua has been included in the Ramsar Convention as a Wetlands of International Importance. The restoration of the wetland, which was drained some decades ago, has evidenced the attenuation of nitrates in groundwater entering from farmlands which exceed 50 mg/l NO<sub>3</sub>- (absorption processes are carried out by the vegetation and the denitrification processes by bacteria of the soil). But nowadays this problem has been solved because of the implantation of 91/676/CEE European Directive. The recently installation of a dense piezometric network (April 2007) has allowed to characterize the groundwater flow pattern and determine the hydrogeological and hydrochemical context in wetland groundwater.

Throughout the last few decades, sulphate and sodium concentrations in groundwater have received considerable attention due to their dominant role in anthropogenic salinization of groundwater. This research focuses on the influence of geological bedrock, land use, anthropogenic activities and hydrodynamics on groundwater hydrochemistry; because pollution problems originated by agricultural practices are not only related to nitrates but also to agricultural sulphates and may contribute to and salinization of wetland groundwater. The mixture of groundwater in Salburua wetland between quaternary flows with the deep ones, allows knowing the hydrochemical variability here exists.

In fact, the increase of sulphate and sodium in groundwater and its isotopic analysis of some groundwater samples, show us the existence of sulphates pollution used in agriculture activities, in this case even more problematic than nitrates. Isotopic values from  $\delta^{34}\text{S} > 15\text{‰}$  in some samples show the existence of vertical fluxes trough the marl bedrock probably related to evaporite deposits. Data show the complexity of hydrochemistry/hydrodynamic studies in this small area. The knowledge of this variability/complexity is necessary in order to make a forecast about groundwater quality in future (included a possible salinization) that can threaten the integrity of hydrochemical processes and requires careful monitoring if freshwater wetlands are to maintain their conservation importance.

**Keywords:** Wetland hydrology; Hydrochemistry; Anthropogenic activities; Stable isotopes.