EVALUATION OF PHOSPHORUS SEDIMENT REMOBILIZATION IN THE ANLLÓNS RIVER (NW SPAIN) USING pH-STAT LEACHING PROCEDURES

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INTRODUCTION

Sediments play a key role in the P cycle in river systems, acting as sinks for soluble P but also as P sources, depending on the environmental conditions.

Phosphorus is a major pollutant of the Anllóns River (Figure 1). Main P sources in the basin are the effluents of a wastewater treatment plant and agricultural activities.

The Anllóns River sediments also contain high As concentrations (up to 265 mg/kg), which can be released by displacement by P, increasing health risks.

The remobilization kinetics of P from bed sediments of the Anllóns River was studied as a function of pH conditions.

METHODS

The timecourse of P release was studied for four sediments (CE1, CE2, M4 and M5) with different location, properties and P concentration (Table 1) subjected to pH-stat leaching at pH 4 and pH 10 during 96 hours.

NOTICEABLE FACTS

- The amount and rate of P release was promoted (14–26 times) at alkaline pH (46% total P released) relative to moderately acid pH (5% total P released). At acid pH the kinetic profiles showed readsorption of released P, while at alkaline pH the release of P progress with time.

- Low release at acid pH suggests association of P with stable phases (Fe oxyhydroxides). P release at pH 10 was positively correlated with dissolved Fe and DOM, suggesting that desorption of P by hydroxyls and/or dissolution of organic matter is involved.

- P exhibited an analogous release behavior to As, which has been identified as an important pollutant in the area, with similar kinetic profiles at both pH conditions, which suggests a strong interaction between both elements.