

## **SPATIAL ANALYSIS OF THE IONIC COMPONENTS OVER CENTRAL AND SOUTHEASTERN EUROPE, 1994-2002**

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### **ABSTRACT**

Central and Southeastern Europe are affected by the higher SO<sub>2</sub> and NO<sub>x</sub> emissions. The annual and monthly average concentrations (1994-2002) of the major ionic components in precipitation are analyzed for 19 stations in central and southeastern Europe. In order to find the ion pattern of the region, Principal Component Analysis has been subjected. The annual pH varied between 4.40 and 6.07 throughout the region. Minimum pH values are found in the eastern part of the region including Poland, Czech Republic, Slovakia, and Austria with a mean 4.67 pH values. The lower Ca<sup>2+</sup> concentrations in the limestone environment correspond to low pH values. However, The Mediterranean part of the Southeastern Europe including Italy, Croatia, Hungary, Serbia and Montenegro and Turkey have a mean 5.58 pH value. In order to evaluate the relative contribution of H<sub>2</sub>SO<sub>4</sub> and HNO<sub>3</sub> to the acidity of precipitation the ratio of nitrate (NO<sub>3</sub><sup>-</sup>) to sulfate (SO<sub>4</sub><sup>2-</sup>) in precipitation have been examined. Furthermore, due to the acidity in rainwater which can be partially neutralized by base cations, the equivalence ratio of H<sup>+</sup>/(SO<sub>4</sub><sup>2-</sup> + NO<sub>3</sub><sup>-</sup>) has been examined to provide an information on the magnitude of such a neutralization.

At the coastal areas, Na<sup>+</sup> and Cl<sup>-</sup> components contributed up to 61% for Na<sup>+</sup> and 36% for Cl<sup>-</sup> of the total average ionic concentrations respectively. They had minimum for inland areas. In general they tend to be more elevated on the Adriatic coasts. This is mostly due to the high Ca<sup>2+</sup> concentrations in these sites. NH<sub>4</sub><sup>+</sup> which comes mostly from agricultural activities is the most abundant cation in Croatia, northern Italy and northern Serbia and Montenegro.