

MASS CONCENTRATIONS OF WATER-SOLUBLE IONS IN PM_{2.5} AT A COASTAL URBAN BACKGROUND SITE IN CROATIA

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INTRODUCTION

➤ the aim of this study was to examine the mass concentrations of water-soluble inorganic ions in PM_{2.5} content during five-year period and to evaluate the possible acidic properties of fine particulate matter as well as contribution of stationary or mobile emission sources to air pollution at Northern part of Adriatic coast

MATERIALS AND METHODS

➤ daily PM_{2.5} samples were collected with Sven Leckel SEQ/47 sampler on Teflon and Quartz fibre filters
 ➤ sampling was performed from 2017 to 2021 at an urban background station located in the city Rijeka at Adriatic coast
 ➤ mass concentrations of water-soluble inorganic anions and cations (Cl⁻, NO₃⁻, SO₄²⁻, Na⁺, NH₄⁺, K⁺, Ca²⁺, Mg²⁺) were determined by ion chromatography with suppressed conductivity detection according to the standards HRI CEN/TR 16269:2017 and HRN EN 16913:2017 (EN 16913:2017)

RESULTS

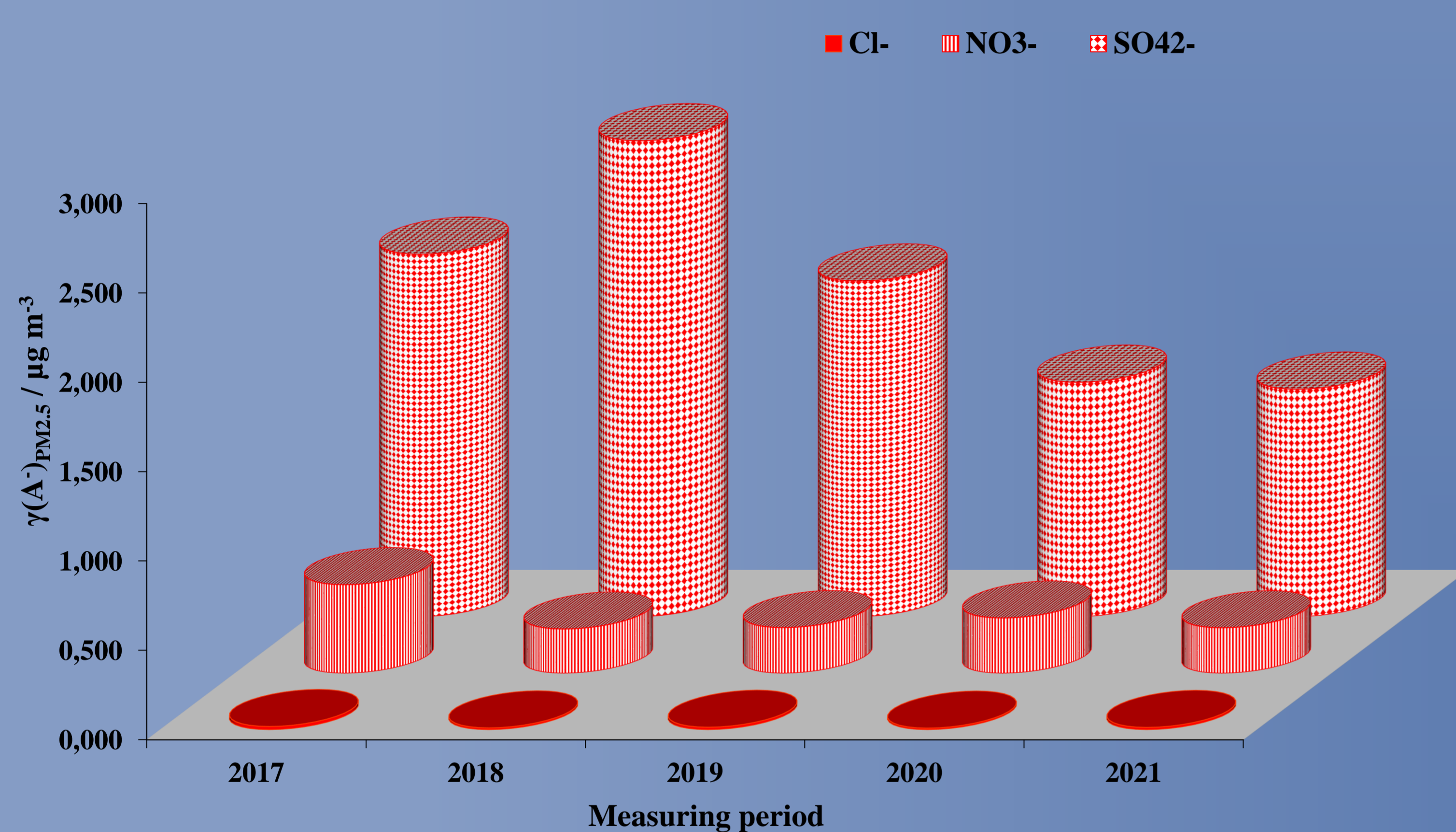


Figure 1. Determined annual average mass concentrations of anions in PM_{2.5}

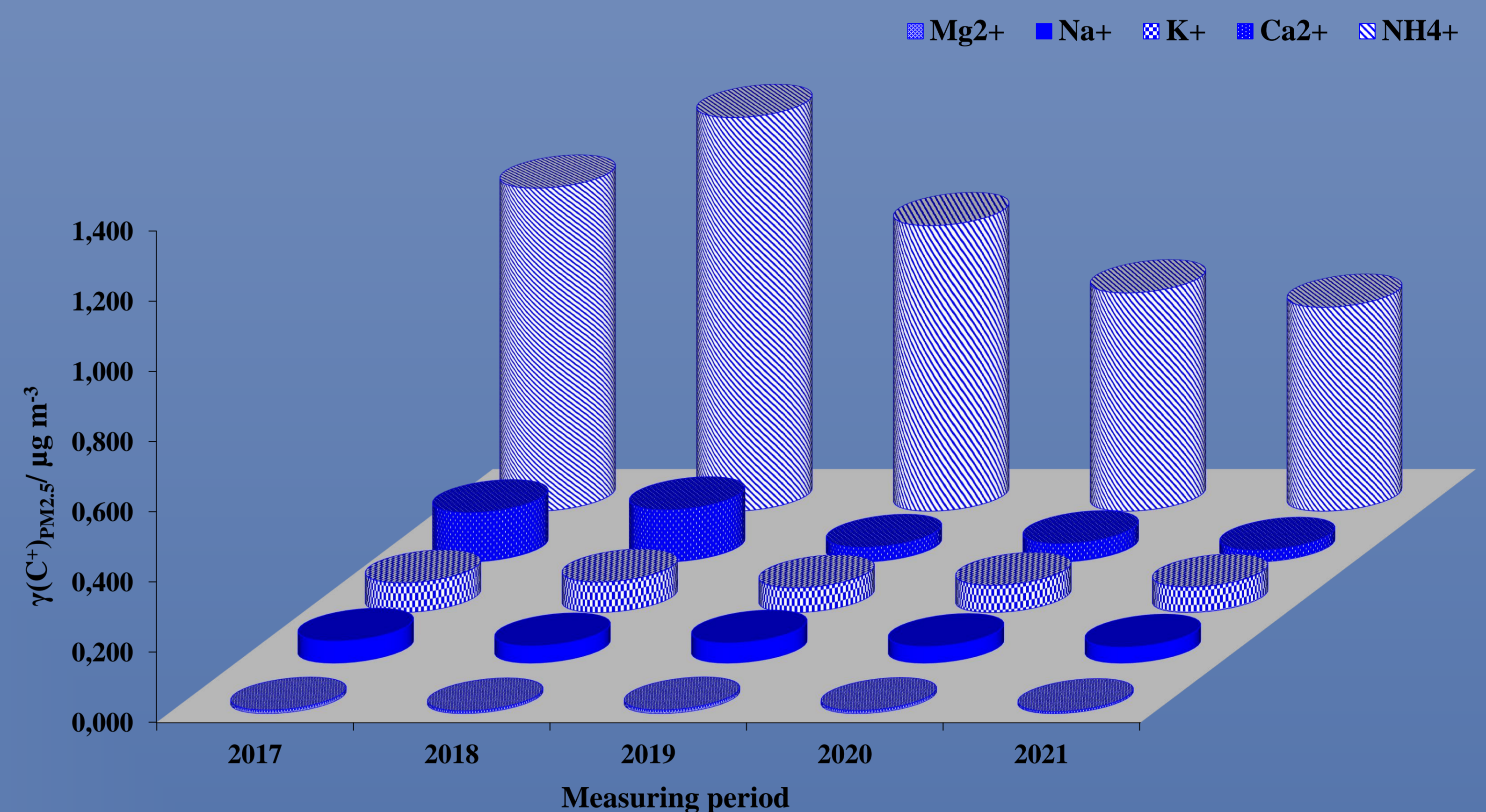


Figure 2. Determined annual average mass concentrations of cations in PM_{2.5}

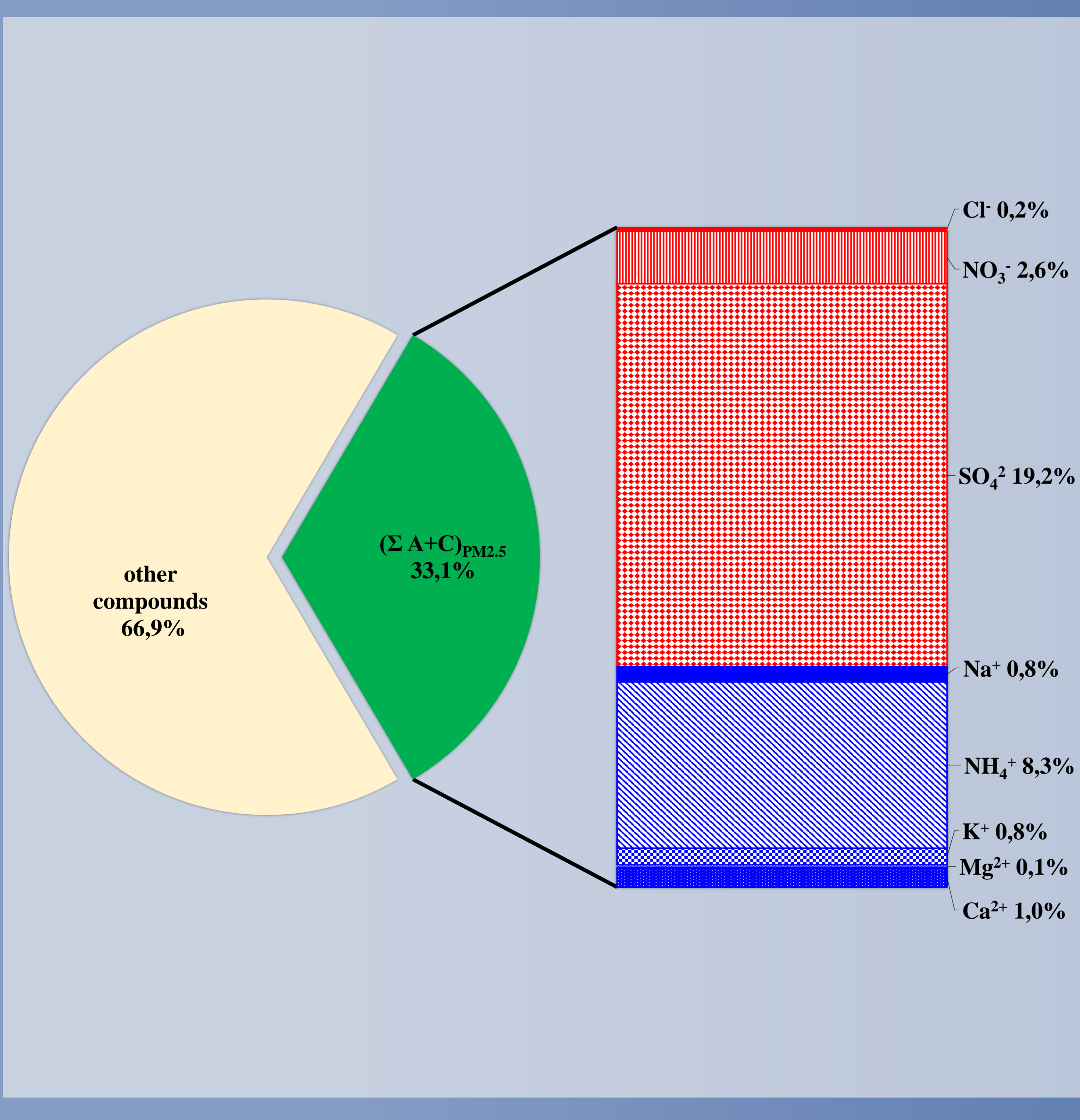


Figure 3. Average ion contribution to the total PM_{2.5} mass for period 2017-2021

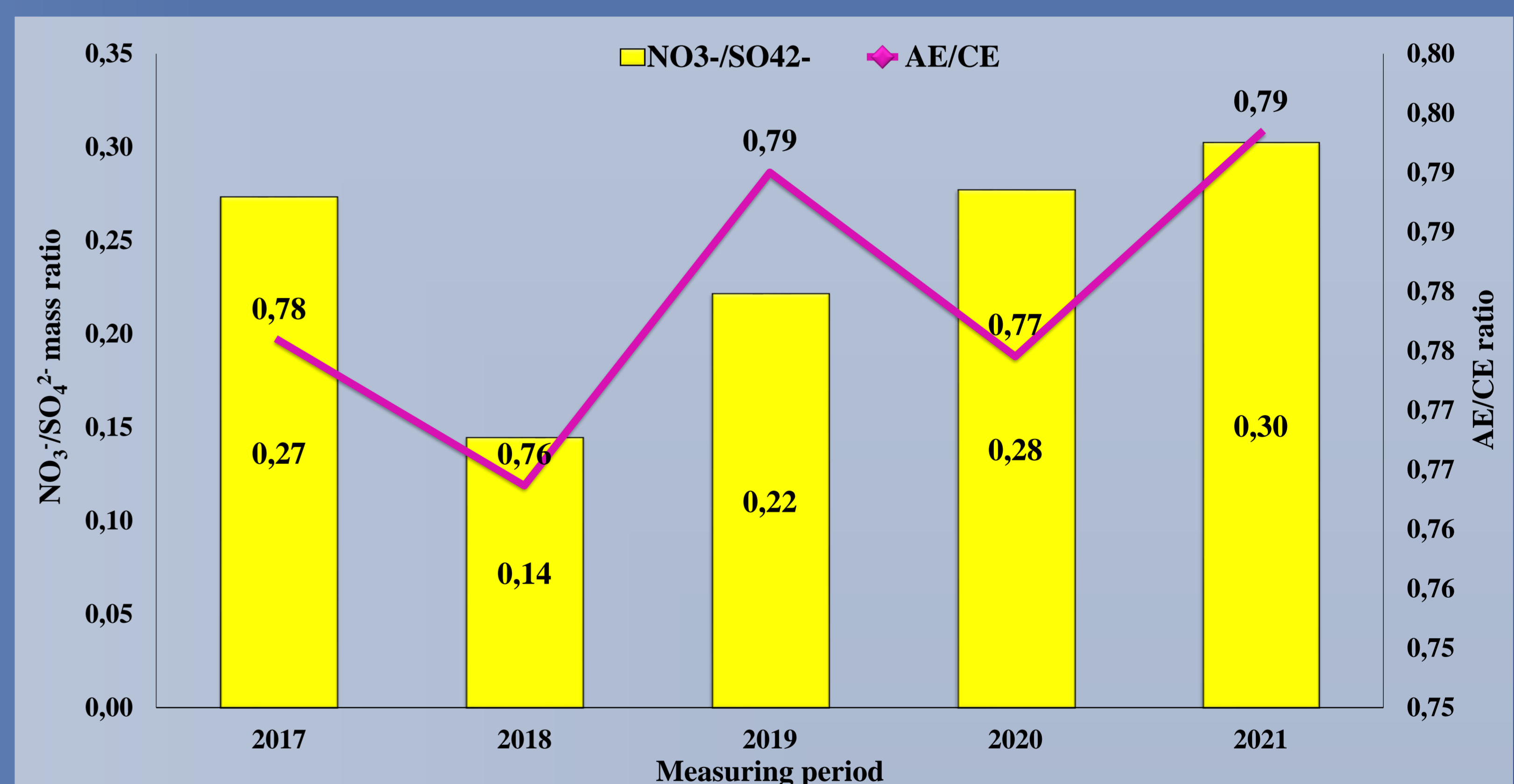


Figure 4. Annual average NO₃⁻/SO₄²⁻ mass ratio and AE/CE charge ratio

CONCLUSIONS

➤ in the measuring period 2017-2021 average mass concentrations of anions and cations in PM_{2.5} ranged from 0.01 µg m⁻³ to 2.6 µg m⁻³
 ➤ in the measuring period 2017-2021 average total anion and total cation mass contribution to the overall PM_{2.5} mass was 33.1%
 ➤ the highest contribution to the overall PM_{2.5} mass was observed for SO₄²⁻ and NH₄⁺ 19.2 % and 8.3 %, respectively
 ➤ in each year annual average charge ratio between the sum of anion equivalents and the sum of cation equivalents was below 1 which indicated the alkaline properties or possible higher contribution of organic anions to the overall acidity
 ➤ in each year annual average NO₃⁻/SO₄²⁻ mass ratio was below 1 which suggests a higher contribution of stationary sources to air pollution at Northern Adriatic coast