

MODELING OF INDUSTRIAL SO₂ EMISSIONS AND TUPRAS FIRE RELEASES DURING 1999 EARTHQUAKE IN GEBZE-KOCAELI, TURKEY

M. Tayanç¹, B.O. Akkoyunlu²

¹*Marmara University, Department of Environmental Engineering, Istanbul, Turkey*

²*Marmara University, Department of Physics, Istanbul, Turkey*

Gebze-Kocaeli region is located in Izmit Gulf and is one of the largest industrial areas of Turkey, including the giant petrochemical industry, TUPRAS. The gulf is surrounded by high hills in north and south reaching up to the height of 900 m and majority of industry is located in coastal areas. This situation leads to trapping and accumulation of pollutants in the gulf region under anticyclonic pressure systems. The region has also special importance in terms of its close proximity to Istanbul and Kocaeli cities. In this study, we present the results of RIMPUFF-Riso Mesoscale PUFF model application to the emissions of Gebze-Kocaeli industrial region and to the releases of 1999 Earthquake in the region. We analyzed the SO₂ distribution over the area by Kriging. The emission inventory is formed by gathering emission data from 202 plants in the region. Ambient SO₂ concentration data are obtained for 8 stations operated by Kocaeli Municipality. After analyzing the distribution of SO₂, 11 days are found to be highly critical with daily average SO₂ values larger than 200 microg/m³. Simulations are carried out for these 11 cases. It is found that SO₂ is accumulating over and nearby of Kocaeli city, causing dangerous atmosphere for the inhabitants. The model simulations for the TUPRAS Fire, indicate the SO₂ dispersion towards Marmara Sea away from the Kocaeli city, thanks for the northeasterly wind that was dominant during the fire period. This situation is validated by the satellite observations.