

### **3.126 Relationship between bioluminescence-based ecotoxicity and water-soluble compounds of fine and coarse aerosol in Jeju, Korea .**

Early Career Scientist

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Abstract:

An ecotoxicity test was conducted to determine the ecological effects associated with water-soluble composition of ambient aerosol from Jeju, Korea (Gosan Climate Observatory, GCO). The water-soluble components were extracted from PM<sub>1</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> collected on the filters, and water-soluble ions and WSOC, organic carbon species and ecotoxicity were measured. *Vibrio fischeri* was used to measure bioluminescence inhibition and the EC10 value, 10% effect concentration, was derived from dose-response curves of each sample. The aerosol ecotoxicity in Jeju, background area, was lower than other studies of urban areas. Overall, bioluminescence inhibition (%) is most related to the major components of the aerosol mass composition, such as SO<sub>4</sub><sup>2-</sup>, NH<sub>4</sub><sup>+</sup>, and WSOC. Higher ecotoxicity levels were increase NO<sub>3</sub><sup>-</sup>/SO<sub>4</sub><sup>2-</sup> ratio or WSOC concentration in PM<sub>1</sub> and PM<sub>2.5</sub> under nearby land outflows with stagnant condition. In several dust events, ecotoxicity was relatively well correlated with PM10 mass, and the ecological impact was significantly higher when elevated NO<sub>3</sub><sup>-</sup> and NH<sub>4</sub><sup>+</sup> levels than when the soil component was increased. Interestingly, we found the ecotoxicity levels were slightly increase with increase abundances of nitrogen-bounded compounds in organic carbon species analyzed by GC-Tof-MS. The relationship between nitrogen containing compounds and ecotoxicity will be verified through the case study of the winter haze and the spring yellow dust events in Aewol, Jeju.