Geophysical Research Abstracts
Vol. 13, EGU2011-11618, 2011
EGU General Assembly 2011

Antimony and arsenic bioaccumulation in Dittrichia viscosa growing in soils affected by mining activities.

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Mining and smelting operations are the greatest source of heavy metalloids emissions including antimony and arsenic into the environment, a situation which is aggravated when such activities have been carried out for centuries. Sb and As display the same range of oxidation states in environmental systems (3 to +5). It is generally accepted that the bioaccumulation behaviour of Sb may be similar to that of As. Indeed, the behaviour of Sb is usually predicted from that observed for As, although Sb concentrations are generally much lower. However, this is only an assumption that has to be confirmed by the experimental data.
Soluble Sb forms can be readily absorbed by plants, as expected from the low mobile fraction of the element in soils. The contents observed and plants are usually below 1 mg/kg. Arsenic, on the other hand, is naturally found in plants, where its concentration seldom too exceeds 1 mg kg-1 for uncontamined areas.
In this work we examined the bioaccumulation of As and Sb in Dittrichia viscosa growing on soils that have been altered and degraded as a result of mining activities carried out over many years in the Sierra Minera of Cartagena-La Unión (SE, Spain). The possible relation between As and Sb in these soils is studied along with the risk of these elements entering the trophic chain through these plants (Dittrichia viscosa). To this purpose, a number of plants were collected and its As and Sb levels were measured. In addition the concentration of the elements in the soils in which the plants were collected were also measured.
The As concentration in leaves was far higher than that of Sb. In the roots, too, Sb concentrations tended to be much lower than those of As. In the soils studied, the bioavailability of Sb was generally lower than that of As.
Dittrichia viscosa is a naturally abundant plant species in soils that have been altered by mining activities, therefore can be considered a suitable plant for phytoremediation since it transfers elements from the soil to the root but it does not then transport the same in any great quantities to the green parts, which are those eaten by animals.