Bioremediation and phytoremediation of contaminated environments

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This session proposal aims to present scientific contributions that highlight topics within the field of bioremediation and phytoremediation in contaminated soil, water and sediment. Among remediation strategies, the use of biological systems represents an effective, cost-competitive and environmentally friendly alternative to the thermal and physico-chemical technologies more traditionally used. Bioremediation is a powerful tool for recovering ecosystems contaminated by pesticides, improperly handled chemicals, industry by-products, toxic wastes and other organic pollutants. Microorganisms are the main responsibles of chemical degradation and bioremediation strategies enhance the normal biodegradation processing that occur in nature, by introducing (bioaugmentation) or increasing (biostimulation) the growth of microorganisms that can naturally transform and degrade contaminants. In many cases, microorganisms can be supported in their degradation by specific plant contaminant-tolerant (plant-assisted bioremediation). Plant-based clean up technologies (phytotechnologies) are gaining popularity as a sustainable technology for the remediation of contaminants. Phytotechnologies can provide removal of pollutants, including inorganic ones such as trace metal elements (heavy metals or metalloids) together with additional benefits such as soil quality improvement, soil carbon sequestration and biomass for biofuels or biomaterials. Due to the difficulty to remediate sites characterized by multiple pollutants (e.g. organic and inorganic toxic compounds), the study of plant-microbial interactions became a new interesting challenge to discover more sustainability soil recovery strategies. In recent years, new DNA-based technologies have emerged for the characterization of microbial communities that may accelerate the isolation and production of microbes of interest. Further, several microbial and plant species have been tested for the remediation of soil contaminants. However, the parameters involved in the contaminant removal and transformation, as well as those involved in the structure and composition of microbial communities need to be better clarified. Both field- and laboratory based research on bio- and phyto-remediation strategies is welcome.