MOSS-BIOMONITORING CHALLENGES IN TRACKING AIRBORNE DUST DEPOSITIONS

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INTRODUCTION

Mosses have been used for biomonitoring in a number of different ways which may lead to rather different results, and some kind of classification seems necessary at this point. *Epigeic* mosses (growing on the ground) are preferred in the regional surveys in Europe . Trace elements may be absorbed on the moss from the atmosphere either as soluble chemical species in wet deposition or contained in particles from dry deposition. Part of the trace element content of particulates may eventually be released by weathering and reabsorbed by the moss. Whereas uptake efficiencies for particulate-bound trace elements are generally poorly known, Ions may be subject to active uptake into cells or attached on the moss surface by physical and chemical forces. Methods are available to distinguish between intracellular and surface-bound fractions of elements. Main problem with issue moss-biomonitoring are reveal as: a) transport of soluble compounds from the soil into moss tissue, particularly during periods withexcessive soil/water contact. Although mosses do not have a root system, influence from this source cannot be disregarded, in praticular in areas with low atmospheric deposition and b) windblown mineral dust from local soil.

Homalothecium sericeum (Hedw.)

Homalothecium lutescens (Hedw.)

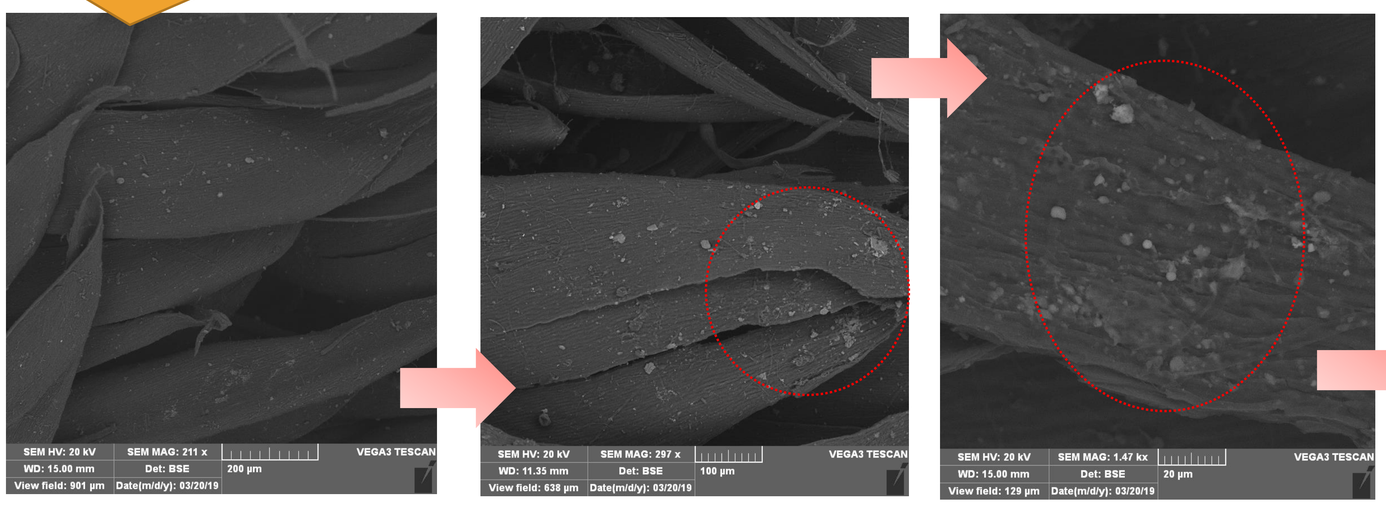
Methodology

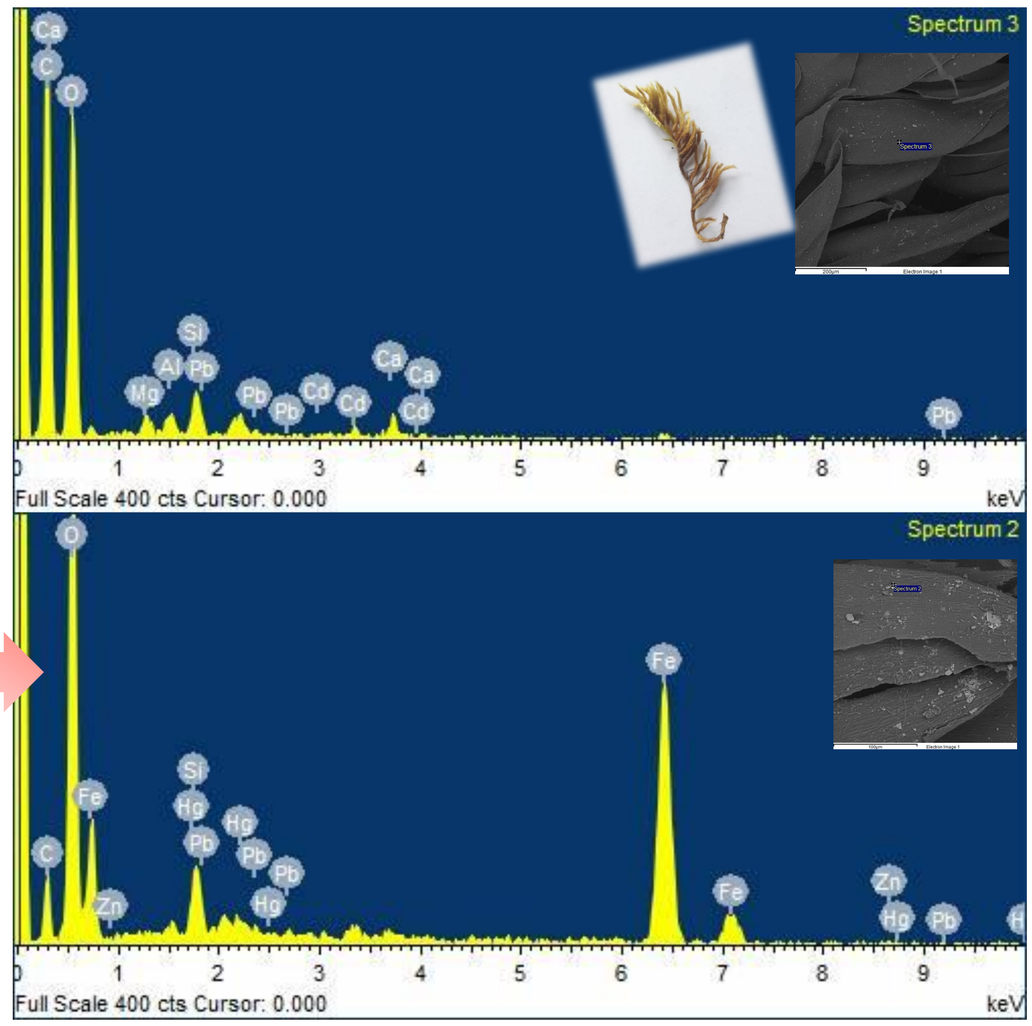
Laboratory analysis using scanning electron microscopy (emission SEM, TESCAN VEGA3) has been involved for determination of the dry deposition occurred within two species (*Homalothecium lutescens* and *Homalothecium sericeum*) from the genus *Homalothecium*. The moss tissue surface was examined in order to improve the dust particle captured and to detect the airborne heavy metals in air-distributed dust. Semi-quantitative analysis has been conducted for airborne heavy metals screening.

Moss samples were collected according to the adopted European protocol (http://icpvegetation.ceh.ac.uk/) also given in Fernandez et al., 2017 [1] . After the moss samples were collected, dry cleaning has been involved in order to reduce as it possible the contamination from soil surface dust particles and other plant species.
Both moss species previously were improve for interchange use in air pollution studies [2]

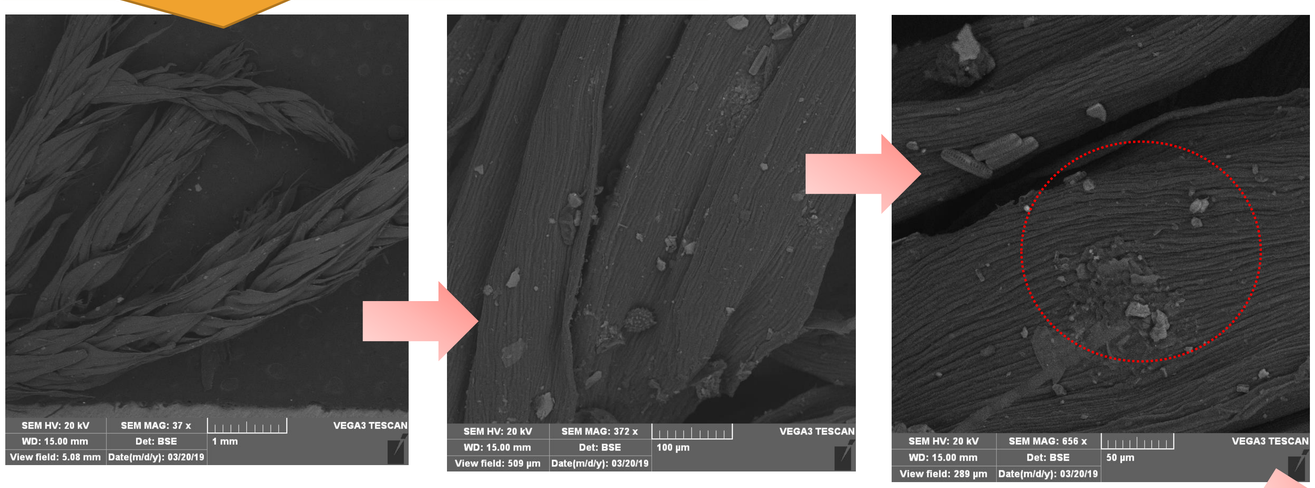
RESULTS

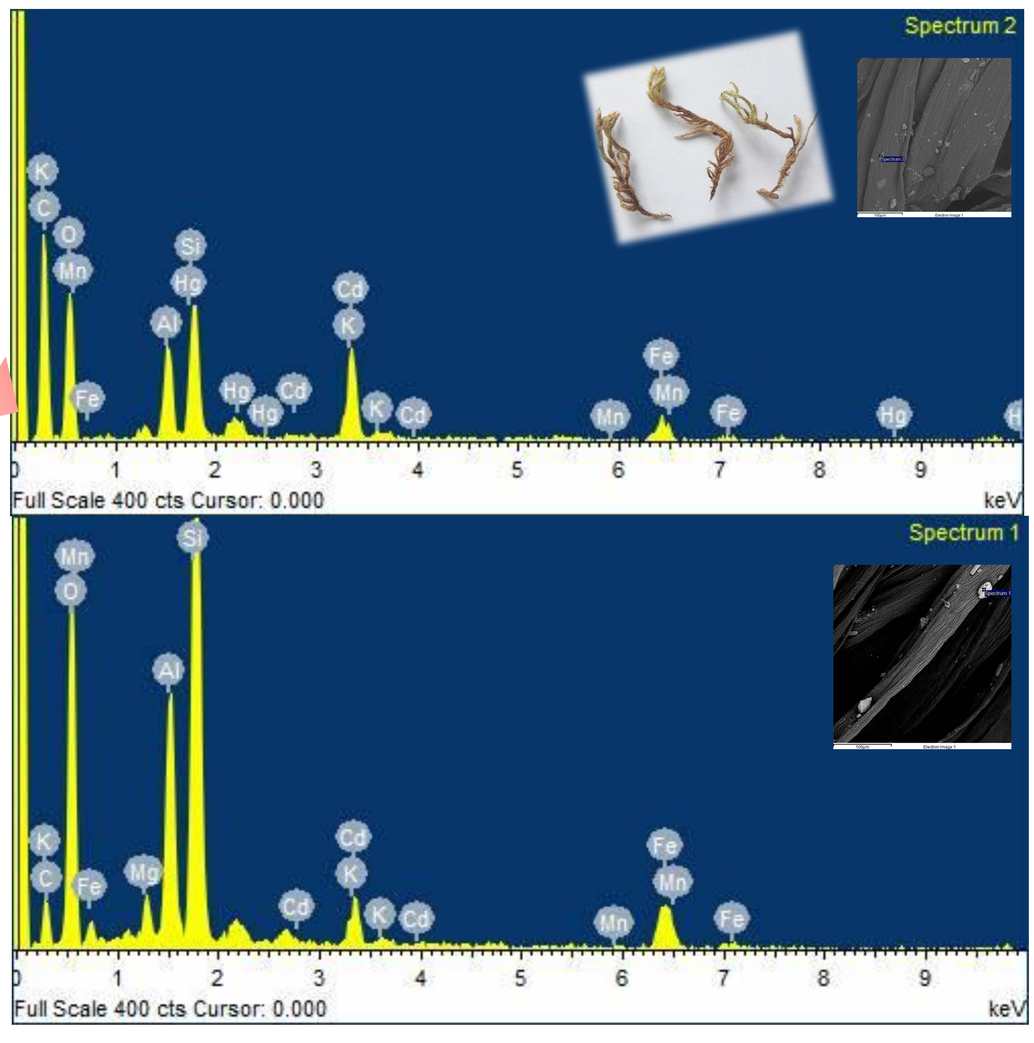
Scanning data for *Homalothecium sericeum*





Scanning data for *Homalothecium lutescens*





General conclusions and perspectives

- Airborne dust particles contaminated with heavy metals were identified on moss surface
- The semi-quantitative analysis *Homalothecium sericeum* identified the sequence of the metals enrichments was determined as follow: **Fe>Pb>Cd>Zn>Hg**
- The semi-quantitative analysis *Homalothecium lutescens* identified the sequence of the metals enrichments was determined as follow: **Cd>Hg>Mn>Fe**
- **Perspective analysis will be implementation of the chemo-metric tool witch will include and multi-element quantification of the dry and wet deposition in moss tissues.**

References

[1] Fernández JA, Boquete MT, Carballeira A, Aboal JR (2015) Sci. Total. Environ. 517:132-150

[2] Balabanova B, Stafilov T, Sajn R, Baceva K (2017) J. Environ. Sci. Health, Part A. 52(3): 290-301

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