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The use of dendrochemistry to reveal pollution history

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Tree rings provide a record of environmental change within the biological requirements of tree survival. Dendrochemistry has successfully applied several analytical techniques for solidstate analysis (e.g., energy dispersive X-ray fluorescence (EDXRF), particle-induced X-ray emission), analysis of wood extracts or digests (e.g., inductively coupled plasma-mass spectroscopy (ICPMS), atomic emission spectroscopy (AES)). EDXRF methods tend to be favored largely because of the capacity for simultaneous analysis of 31 target or marker elements and compounds at a high spatial resolution (50 μm) across the tree-ring sample. In this study, we describe the dendrochemical investigation methods and results in known pollution cases, contaminations with PAH, HVOC, PCB and BTEX or metallic compounds, within the course of an international project named PIT (pollution investigation by trees). Since PIT was to run over 40 cores for its dendrochemical investigations, and owing to the complexity of handling such large files combining serial entries, multiple compounds, (up to 200 000 data entries per tree core resulting from line scanning the cores every 50 μm and over 30 analytical data gained at each point) and a variety of computational operations needed, a Microsoft Excel template was developed and named SCANCHEM. This template eases data preparation and organization of dendrochemical analyses and data exchanges within the scientific team.