Evidence of metal-carbon residues tracing lightning phenomena in intact surfaces of the Younger Dryas event

Marie-Agnès COURTY[1],Thierry GE[2], Pascal ANDRE[3], Françoise MASSINES[1]

[1] PROMES UPR 8521 CNRS - Univ. Perpignan. Tecnosud, Perpignan, France. marie-agnes.courty@promes.cnrs.fr
[2] INRAP-GSO, 140 av. Maréchal Leclerc, , CF 5036 33323 Bègles cedex , France. thierry.ge@inrap.fr
[3] LPC, Univ. Clermont Auvergne, CNRS/IN2P3, UMR6533, F-63000 Clermont-Ferrand, France. pascal.andre@uca.fr

Considerable studies on the Younger Dryas boundary layer have not yet allow to elucidate the provenance of the anomalous components that form the YDBL signal: platinum peak, nanodiamonds, melted spherules, glassy carbon. We present here the innovative methodology that we have developed to link atmospheric electricity and lightning with the unique products of YDBL signal. We compare (1) experimental nanocomposites produced by electric discharge at atmospheric pressure; (2) natural nanocomposites formed by present-day lightning; (3) microstratified well preserved ancient surfaces showing thin layers of polymer films and unusual minerals. We use two records of the Younger Dryas event: (1) the Audenge-Maignan site in the sand dune fields of the Arcachon basin (France); (2) the Roquemissou limestone rockshelter (Aveyron valley, France). We reproduce experimentally by electric discharge all the nanomaterials of the YDBL signal. Our results incite to propose that the YDBL expresses a period of enhanced atmospheric electrification in response to high atmospheric dust loading linked to volcanism, wildfires and weather instability.