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JÉRÔME BALESSENT (1957–2020): IN MEMORIAM

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Jérôme Balesdent
1957–2020

Jérôme Balesdent passed away on July 19, 2020, at the age of 63. The scientific community has lost an outstanding researcher and a colleague who has always been committed to teamwork and the involvement of the younger generation.

Jérôme was creative throughout his career, starting at the French Institute for Research in Agronomy (INRA) in Nancy, then Versailles, Cadarache and finally, Aix-en-Provence. As an agronomist, he left his mark on the world of soil science. He is among the most internationally recognized French researchers for his work on soils and the dynamics of soil organic matter.

Jérôme Balesdent was always one step ahead. He was the inventor of the use of ^{13}C to trace constrain carbon dynamics in soils. Using ^{13}C , he measured, as a function of time, the introduction of corn-derived carbon (C_4 photosynthesis) into a soil that had only seen C_3 plants. The constraint of the fast component of soil organic matter dynamics was born. This approach, published in 1987 (Balesdent et al. 1987), is a reference today with nearly

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800 citations and many emulators. This stable carbon isotope was a complement to his toolbox, which already contained another carbon isotope, ^{14}C , with which he had already studied the dynamics of the slower components of SOC (Balesdent and Guillet 1982). Beyond the design of novel methods and the acquisition of invaluable data, Jérôme was also a pioneer in the modeling of soil organic matter content (Elzein and Balesdent 1995). His 1995 paper was a landmark, and it is still this exponential form of the soil carbon age profile that is used in current models.

One will also recall his intervention at the French Academy of Agriculture in 1999 (Balesdent and Arrouays 1999), during which he already affirmed that the soil “could be a huge potential source or sink of CO_2 and that an annual increase in this reservoir of only 0.4% per year would store as much carbon as the burning of fossil carbon emits.” It is this vision that served as the basis for the international initiative “4‰ – soils for food security and climate” that was launched by France in 2015 at the COP21, 15 years after its intervention at the Academy. In 2018, in a meta-analysis published in *Nature* (Balesdent et al. 2018), he insisted on the inertia of the carbon cycle in soils, particularly at depth. He underlined the need to consider the soil profile in its entirety and to account for its historical use when modeling the global carbon cycle and its links with the climate. This paper illustrates the interest that Jérôme always had in the modeling and conceptualization of soil carbon processes.

Beyond the renowned scientist, Jérôme Balesdent was also a generous, available, smiling, optimistic and positive being, eager to transmit his expertise. Many can attest to the encouragement he gave to all those who came to him for advice. He will be greatly missed by the French and international soil science communities.

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