



## **Middle Jurassic dinosaur footprints from the Serras de Aire and Candeeiros**

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### **Abstract**

The Dinosaur Footprints Natural Monument of Ourém/Torres Novas, known as Galinha quarry, and the Vale de Meios quarry, are located in the Serras de Aire e Candeeiros Nature Park (Central Portugal). They are two geosites, duly geoconserved, of recognized international scientific value, due to its exceptionalism regarding to the age, size, and quality of preservation of ichnites. Both quarries are located in limestones of the Serra de Aire Formation (Bathonian, Middle Jurassic) (Azerêdo 2007). The Galinha quarry preserves 20 trails with sauropod footprints, in an excellent state of conservation, and it is possible to observe finger marks and a ridge formed by the sediment that was removed under the weight of the animal. This deposit has some of the oldest and longest sauropod tracks known in the world (up to 147 m long) and allows to obtain a dynamic image of the locomotion of these sauropods (Santos et al 2009). The Vale de Meios quarry preserves more than 700 theropod tracks. They are organized in at least 80 unidirectional trackways, arranged in a bimodal orientation pattern (W/NW and E/SE). Paleoenvironmental studies in this quarry indicates an inter-tidal flat located at the margin of a coastal barrier (Razzolini et al 2016).

These quarries constitute a world-class Serial Site for understanding some of the oldest paleoenvironmental and paleoethological interactions involving sauropods and/or theropods. The ichnites of the Galinha quarry, with oval pes prints and speech-bubble-shaped manus prints (Castanera et al 2016), have provided an important contribution to the knowledge of sauropods at an early stage of their development. It was even possible to describe *Polyonyx gomesi* as a new sauropod ichnotaxon (Santos et al 2009). Vale de Meios quarry, is one of the most important sites with Middle Jurassic theropod tracks. The occurrence of *Megalosauripus* tracks represents the oldest occurrence of this ichnotaxon (Razzolini et al 2016).

Discovered and studied since the 1990s, multiple scientific studies have been carried out on these dinosaur track sites (Santos 2016), involving several international researchers. Similarly, since their discovery attracted educational and tourist visits, from nationals and foreigners, and they are currently duly protected and equipped for this purpose.

### **Keyword**

Dinosaur footprints, Middle Jurassic, Bathonian, Serras de Aire e Candeeiros Natural Park, Portugal