Diminishing dinosaur steps saved by laser and laptop

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The Fumanya site, in the Bergueda region of central Catalonia, is so delicate that experts cannot get physically close enough to the tracks to examine them.

In the years since the tracks were discovered they have been exposed to the elements, and as a result are severely weathered and eroding at a rapid rate.

To make things even more difficult, the tracks are imprinted into near-vertical rock faces.

Palaeontologists feared the tracks could be lost forever - but a permanent and detailed record has now been created using cutting-edge equipment.

Using a high-tech laser scanning system called RIEGL, researchers from The School of Earth, Atmospheric and Environmental have produced an interactive 3D model of a quarry face covered in thousands of tracks made by the late Cretaceous dinosaurs, including sauropods and possibly predatory theropod dinosaurs.

The portable system, which is powered by a battery, works by rotating and firing laser beams, which reflect off the quarry faces back to a receiver. The device then cross references the reflections with a built-in digital camera and GPS, and feeds the information into an attached laptop. Software is then used to create a detailed and very accurate 3D computer model of the location.

This technology has allowed researchers to closely examine and analyse the Spanish quarry tracks from many different angles and even inside out.

This information is very important for palaeontologists and dinosaur locomotion experts, because it gives an insight into the way these dinosaurs moved and the environments in which they lived.

The on-going project - run in conjunction with Universitat Autonoma de Barcelona - is being led by palaeontologist Dr Phil Manning, who received a grant of Euro 9,000 from the Consorci Ruta Minera to fund the laser scanning.

The computer modelling for the project was done by Dr David Hodgetts, a senior lecturer in Reservoir Modelling and Petroleum Geology.

Student Karl Bates, who is now carrying out Post Graduate research into dinosaur locomotion, worked on the Fumanya tracks for his MPhil degree project.

Karl said: "Due to the fragile environment and the sensitivity of the site we were not permitted direct contact and therefore all measurements had to taken remotely.

Dr Manning added: "Laser scanning allowed the rapid, high resolution, 3D digital mapping of an otherwise inaccessible site. The computer-generated trackways we have created preserve important information on the locomotion of dinosaurs, which can be properly accessed for the first time."

It took four days for a team from the School of Earth, Atmospheric and Environmental Sciences to collect all the necessary information to create a comprehensive 3D model of the quarry, although some initial results

were available within just 15 minutes.

The quarry, which lies to the north of Barcelona, was still active until fairly recently, but there are now plans to make it a protected site of special scientific interest.

Dr Manning was part of the UNESCO team who initially evaluated the trackway localities in Northern Spain, as part of a pending Iberian Peninsula World Heritage Site application.

Although the footprints are imprinted in a vertical cliff face, the surface the dinosaurs travelled across millions of years ago would have been flat.

The School of Earth, Atmospheric and Environmental Sciences was the first academic department in the country to acquire the RIEGL scanning equipment.

Only one other department in the UK can boast such equipment.

The equipment is generally used in oil exploration, but this project is the first time The University has used it to create images of dinosaur tracks.

Dr Manning has also extended the use of the scanner to palaeontological investigation in the Hell Creek Formation in the United States, home to the infamous Tyrannosaurs Rex.

Source: University of Manchester