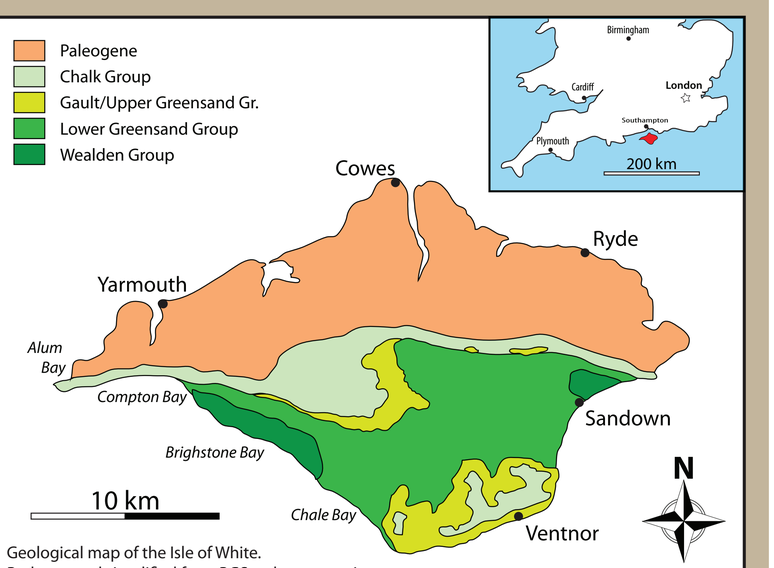
# Variety and interpretation of dinosaur tracks from the Isle of Wight (Lower Cretaceous, Southern UK)


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## Where do these tracks come from?

Dinosaur tracks and traces have been known from early Cretaceous (late Barremian - early Aptian) strata on the Isle of Wight (off the south coast of England) since the late 19th Century. Described traces from the Island include those interpreted as having been left behind by medium-to-large sized ornithopods, small-to-medium sized theropods as well as the possible tracks of sauropods. Here, we augment the dinosaur tracks known from the Isle-of-Wight by presenting a large collection of footprints all collected from the Vectis Formation, exposed on the southern coast of the Island. Although the precise stratigraphical location of the footprint site is not reported here, all the specimens come from *Diplocraterion* Bed 1 (Radley et al., 1998).




Geological map of the Isle of White.
Redrawn and simplified from BGS web map service

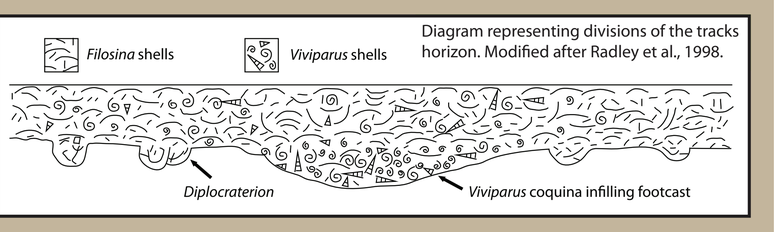



Diagram representing divisions of the tracks horizon. Modified after Radley et al., 1998.

## What are we talking about?

**DD 01.** This track is longer (16 cm) than wide (11 cm), roughly bell-shaped and with its anterior part larger than the posterior. Three possible digits are present, short and rounded with no claw impressions. The deepest part is located in the middle of the track, but this preservation could be due to recent erosion. The three blunt toes, together with the general shape of the track, allow us to identify this print as a possible *Deltapodus* (Romano and Whyte, 1995).

**DD 02.** This tridactyl track is roughly as long (13 cm) as wide (11 cm), with short rounded digits and interdigital angles that are symmetrical. Its short blunt digits and symmetrical interdigital angles suggest an ornithopod

**DD 03.** This footprint is slightly longer (18 cm) than wide (17 cm), is asymmetrical (II^III < III^IV) and with digit III probably the longest. All digits are slender with tapering terminations; no pads or claw mark impressions are preserved. These morphological features allow us to identify this footprint (with a reasonable degree of certainty) as a theropod track.

**DD 04.** This trace is one of the most ambiguous recovered. At first glance, it might be considered to be from a sauropod manus, whereas in the color-coded 3D model it is possible to see three clear digits, with probable digit I and metatarsal impressions. The maximum depth of this track is around the middle of the print and is thus probably a result of recent erosion. This print is longer (17 cm) than it is wide (13 cm) and is slightly asymmetrical (II^III < III^IV). No further information is available, but it is identified here as a probable theropod footprint.

Tracks from **DD 05** to **DD 08** present no clear pad impressions or claw marks and all have similar morphological characteristics: slender digits with tapering terminations, asymmetric interdigital angles (II^III < III^IV), although all are slightly different sizes. All these preserved features allow us to identify them as theropod tracks.

**DD 09.** The preservation of this footprint is quite poor and morphological characteristics are barely identifiable. However, two digits are visible while the third is not well preserved. The footprint is slightly longer (22 cm) than wide (19 cm), and almost symmetrical; the digits are blunt and short probably because of erosion.

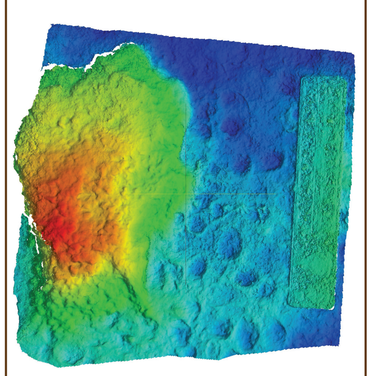
**DD 10.** The preservation of this footprint is very poor but it is possible to clearly recognise two rounded digits while a third is only partially preserved .This footprint is longer (23 cm) than wide (21 cm) and has slightly asymmetrical interdigital angles.
As for DD_09, the symmetry in the interdigital angles and the short digits allows to suppose an probable ornithopod trackmaker.

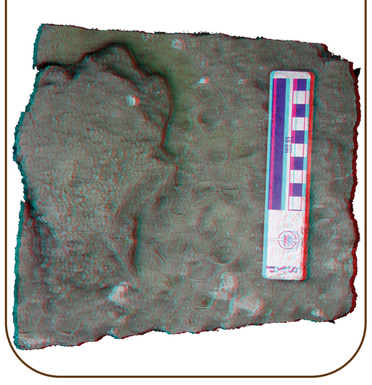

### References

RADLEY J.D., BARKER M.J. and HARDING I.C. 1998. Cretaceous Research, 19: 471-487.
BELVEDERE M., MIETTO P. and ISHIGAKI S. 2010. Geological Quarterly, 54: 367–380.
WHYTE M.A. and ROMANO M. 1994. Gaia, 10: 15-26.


## DD 01

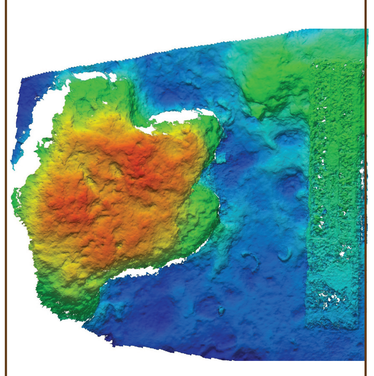


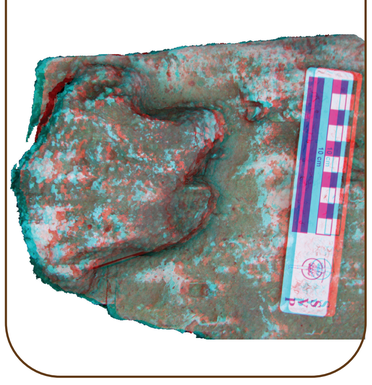




## DD 02

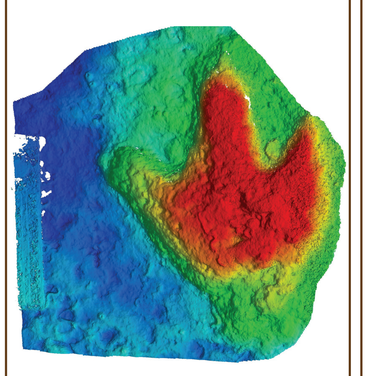


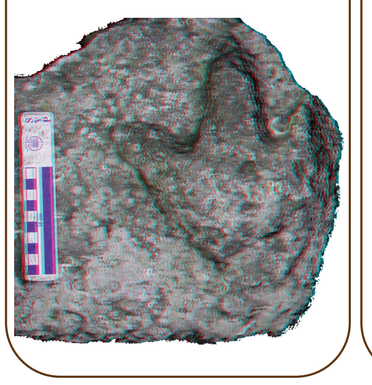




## DD 03

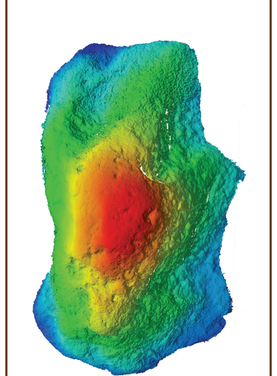






## DD 04

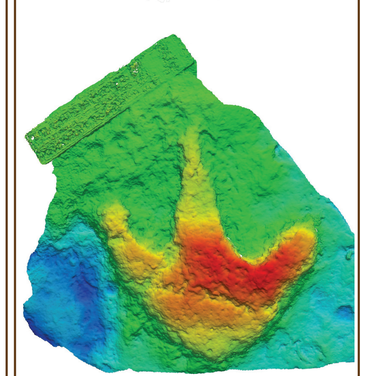


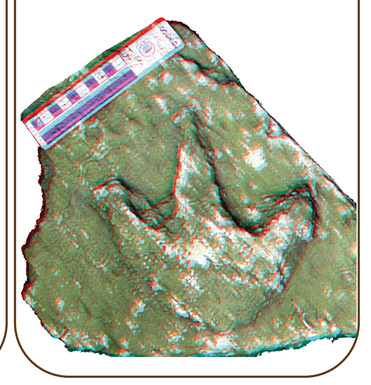




## DD 05



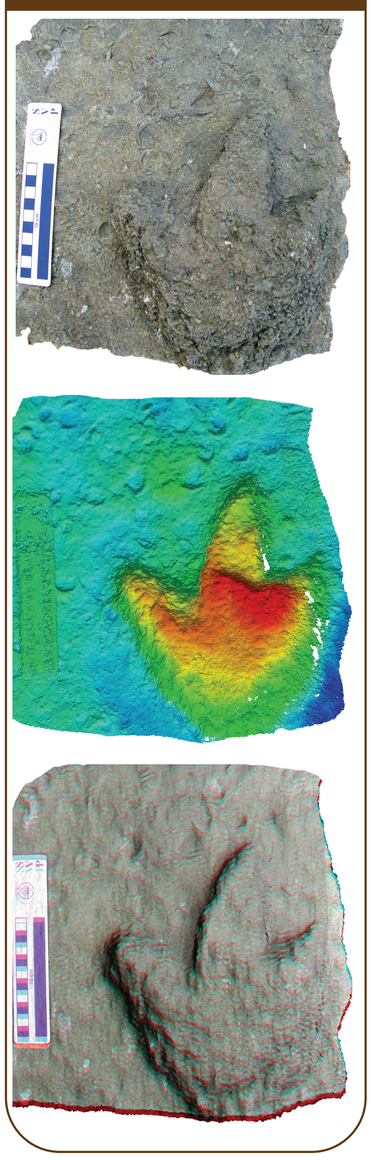




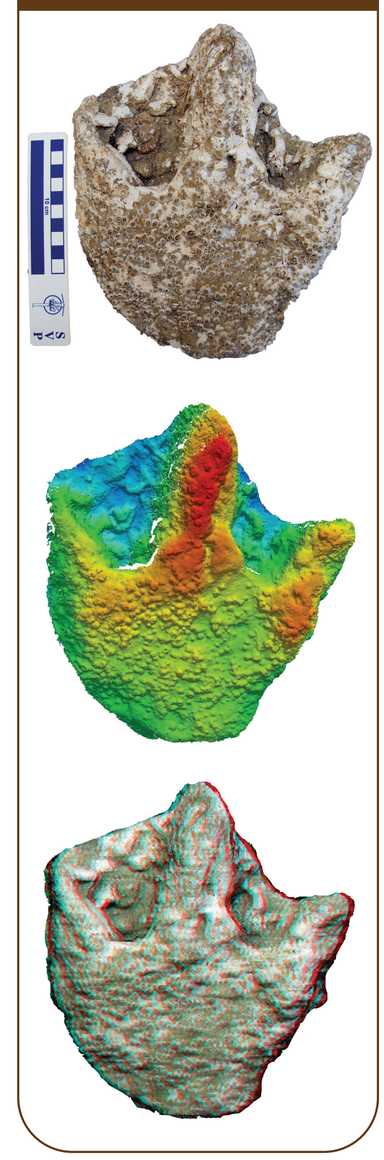
## What did we do? Why is this new?

This is the one of the first applications of cloud-sharing 3D models in ichnology. The 10 tracks in the collection were photographed February 2012, using a Fujifilm S8000fd (8 million pixel), and the data were shared through a cloud-based software (Dropbox) software. The photos, taken without any photogrammetric purpose, were processed with Agisoft Photos can Pro (a. 0.8.4). Although with the presence of some holes due to the small amount of photos (about 5 per specimen) and the lack of angles ones, 3D models were generated with a resolution (sub-millimetric) high enough to generate colour-coded maps of footprint depths (using Paraview v. 3.14). Measurements of tracks were then made directly using meshes generated in Polyworks (v. 10.0) following the procedures applied and tested in Belvedere et al. (2010).

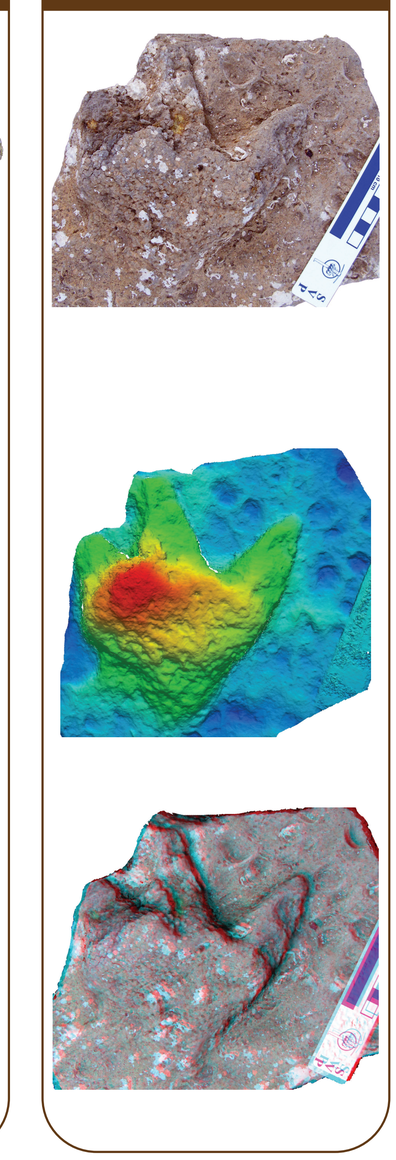
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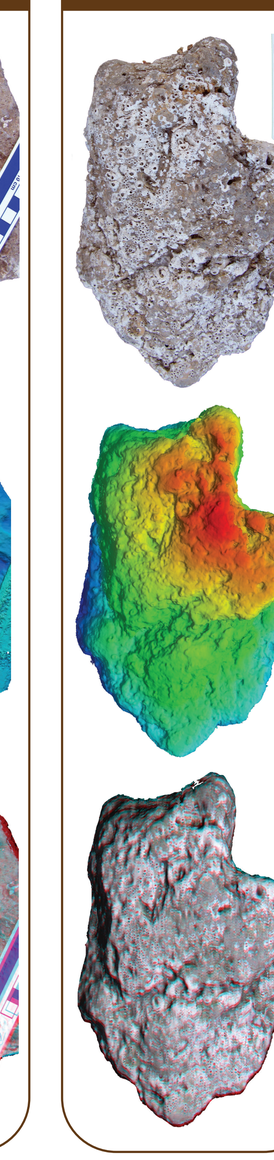
## DD 07



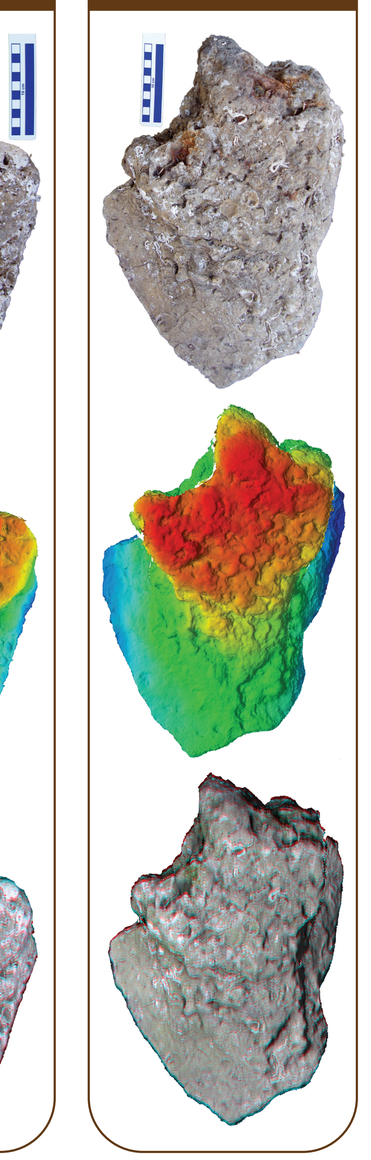
## DD 08



## DD 09



## DD 10



## Concluding

Although very preliminary and based on few prints, this study increases our baseline knowledge of Isle of Wight dinosaurs and highlights the potential of ichnological analyses which will provide more detailed palaeobiological data in the future. Our ongoing work will allow, for the first time, a comprehensive review of the dinosaur ichnoassociations that are known from the Isle-of-Wight.

## Glasses pod