SUPPLEMENTARY INFORMATION

A new Argentinean nesting site showing neosauropod dinosaur reproduction in a Cretaceous hydrothermal environment

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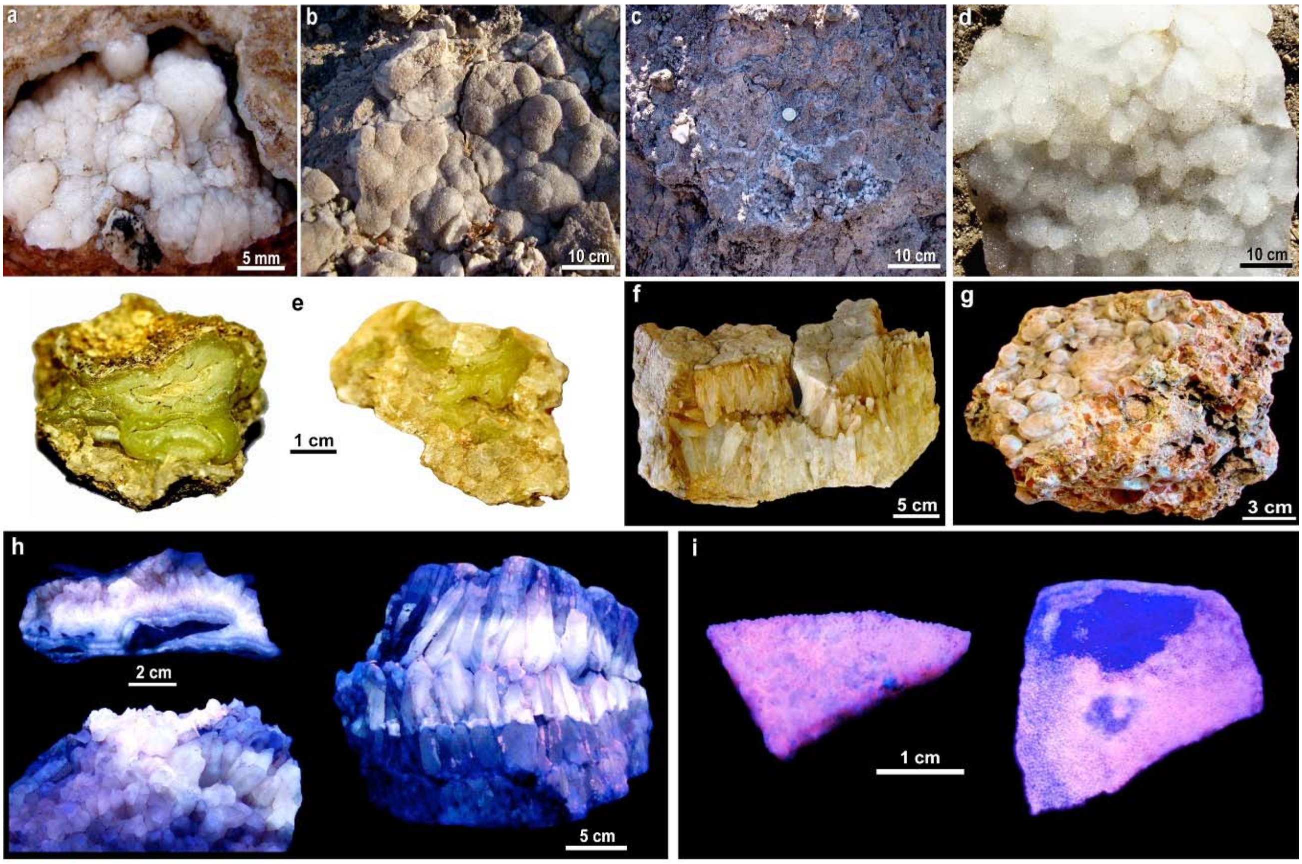
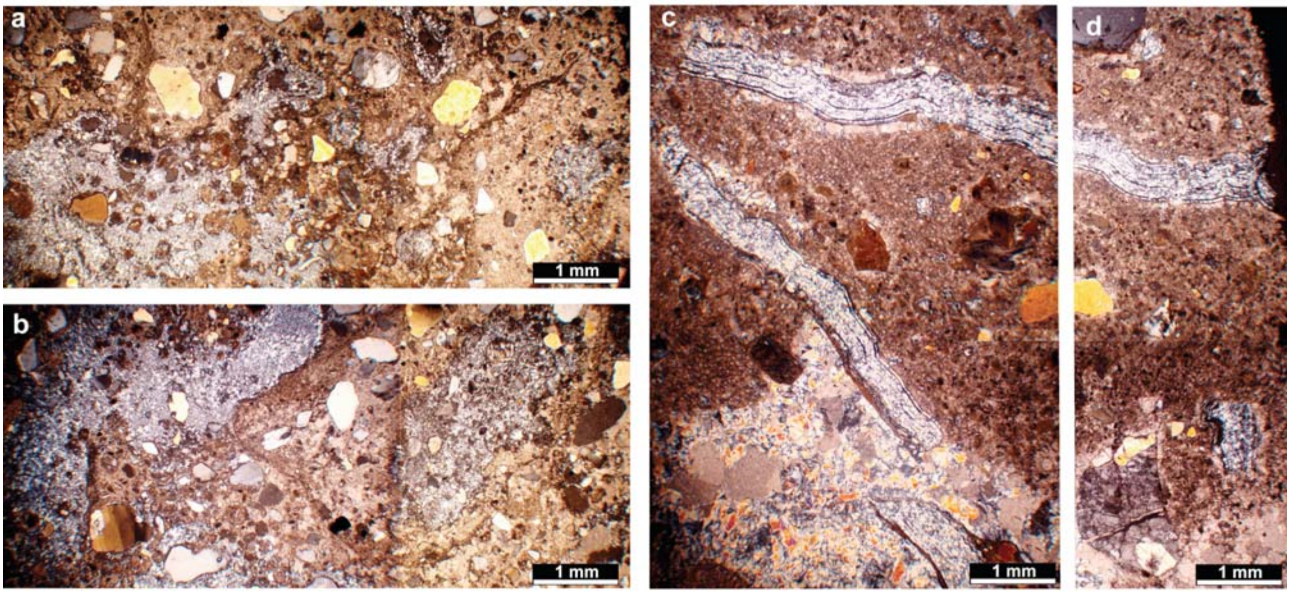
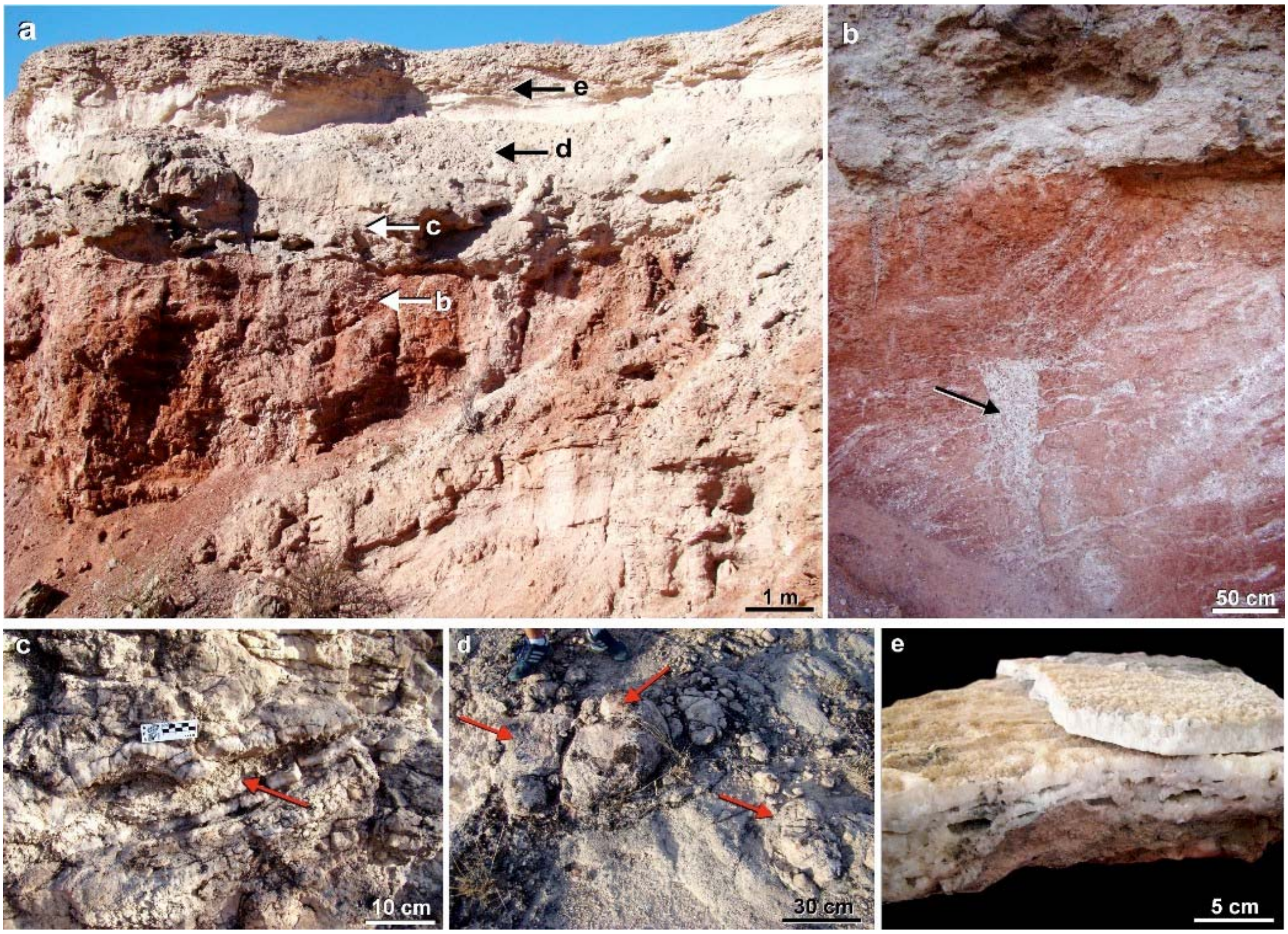


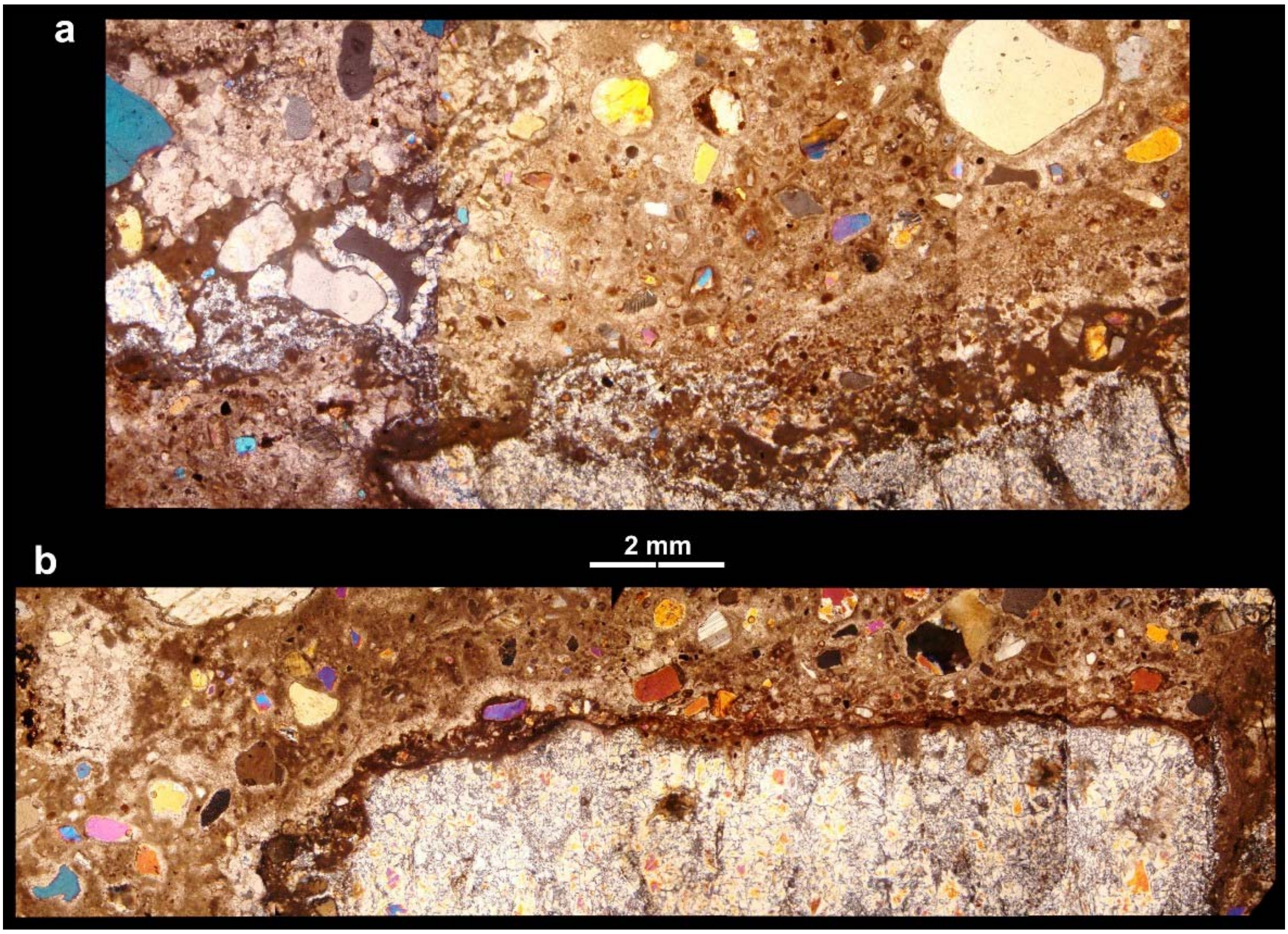
Supplementary Figure S1 | Hydrothermal minerals from the nesting site. a, b and **d**, Various siliceous crystals in druses associated with eggs. **c**, Blue calcite crystals in a druse. **e**, Green chrysoprase from hydrothermal processes that precipitates from saturated solutions at low temperatures (<100 °C). **f**, "Dog teeth" calcite crystals that are ubiquitous at the nesting site. **g**, "Silicate milky crystals" that precipitate from hot solutions from 60 °C to 190 °C. **h**, **i** Calcite crystal (calc-sinter structures) and eggshell fragments under UV light.



Supplementary Figure S2 | Transmitted light microscopy observations of sedimentary rocks at the SGP. a and **b**, samples from the egg-bearing sediments (upper section of the Los Llanos Formation). **c,d** samples from the lower section of Los Llanos Formation. Our petrographic thin sections exhibit typical hydrothermal micro-fabric with diagenetic replacement silicates and micro stromatolite filaments. Chalcedonic quartz infilled sediments and the original micrite could be secondarily replaced by micro-spar and chalcedonic and micro-chert quartz cement.

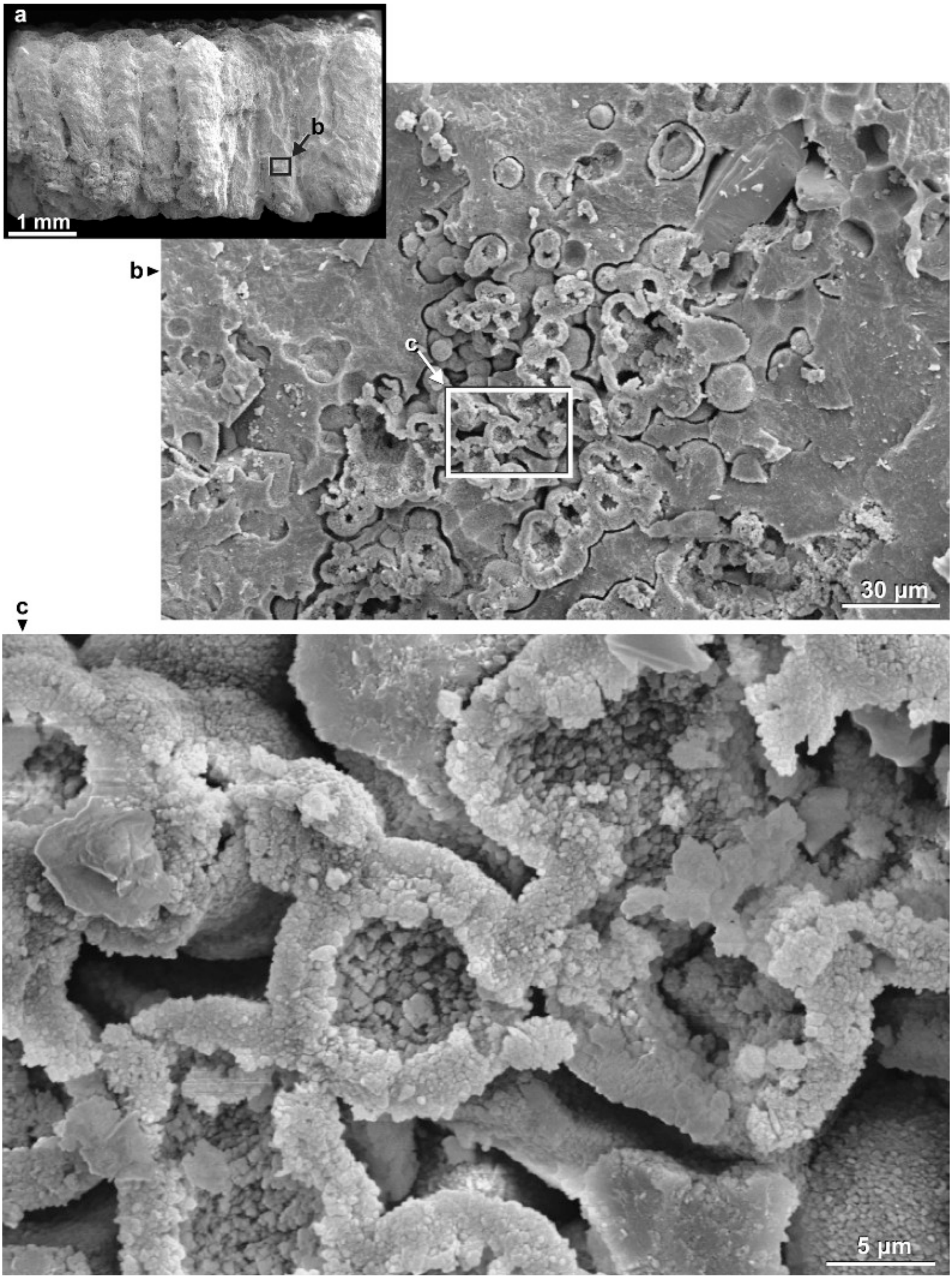


Supplementary Figure S3 | Hydrothermal structures present in the nesting site. a, outcrop of Permian (red) and Cretaceous (grey) formations at SGP with respective detailed subfigures b, c and d. **b**, the upper level of Sauces Formation (Lower Permian) shows a hydrothermal pipe replaced by calcitic matrix (black arrow). **c**, large calcite geode (red arrow) at the lower section of Los Llanos Formation (L.Ll.F). **d**, silicate domes and sandstone mounts (red arrows) at the middle section of L.Ll.F. **e**, large veins of calcite crystals at the upper section of L.Ll.F. interspersed with the egg-clutches.

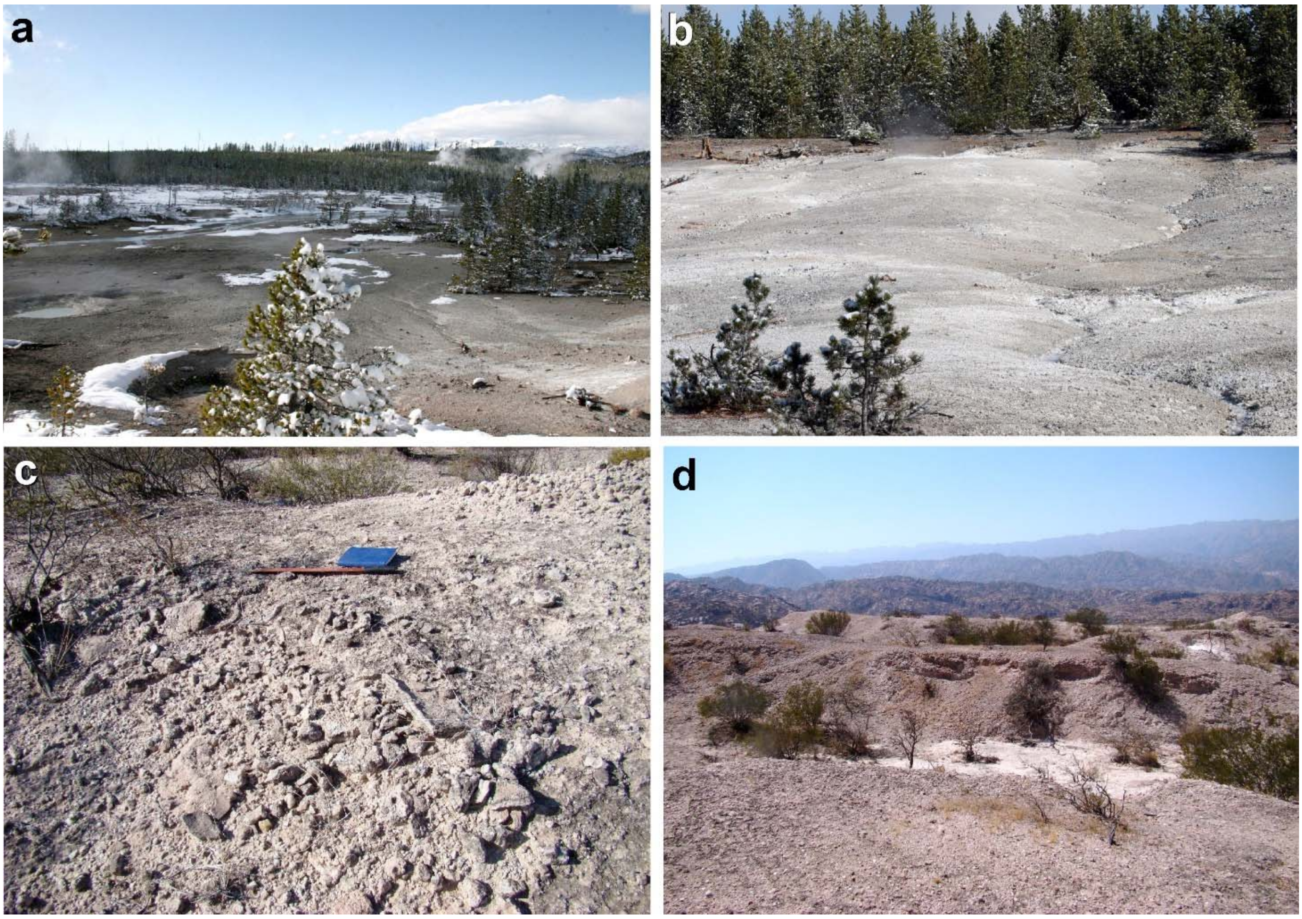


Supplementary Figure S4 | Transmitted light microscopy observations of sedimentary rocks with eggshell fragments at the SGP. a, arkosic sandstone with eggshell fragment eroded by warm (acidic) hydrothermal fluids and partially replaced by calcitic and silicate minerals. **b**, eggshell fragment with chalcedony replacement.

The warm acidic hydrothermal fluids dissolved first the thick eggshell outer surfaces, which contributed to a general thinning of their structures, and concomitantly replaced the original calcitic eggshell by micro silicates.



Supplementary Figure S5 | SEM chracterizations of an eggshell specimen. a, radial view. **b**, Magnification of **a.** Opal-A microspherules. **c**, magnification of the Opal-A the microspherules. Presence of botryoidal opal-A microspherules is common in the altered eggshell sections and further support hydrothermal-related diagenesis[41-43].



Supplementary Figure S6 | Yellowstone and Sanagasta Parks. Comparison berween the Norris Basin at the Yellowstone National Park geological landscape (**a** and **b**) and nesting site at Sangasta (**c** and **d**). The Norris Basins hydrothermal activities and ensuing structures and sediments are analogous to those observed at the Cretaceous Sanagasta neosauropod nesting site.

Supplementary Table S1 | Comparison between the Sanagasta faveoloolithid and other faveoloolithid materials													
	Egg shape	Egg Ø (cm)	Nodular ornamentation compartitubercul ate	Acicular calcitic crystals	Units ramified	Dichotomic or politomic ramification	Eggshell thickness (mm)	Pore straig ht or mean der	Pore bifurcation (none, one, more)	Structural morphotype	Pore system	Rounded or elongated nodes	Each unit finished outside
Sanagasta´s eggs	Subspherical	18 - 23	yes	yes	yes/no	both	1.29 - 7.9	both	none/one/more	discretispherulitic, filispherulitic, other	tubocanaliculate, multicanalitucalte	both	yes/no (main and ramified not ever)
Faveoloolithid from Río Negro (Arg) (1)	Spherical	18 - 21	yes	yes	yes	both	4 - 6	mean der	more	filispherulitic	multicanalitucalte	rounded	no(only the ramified)
Faveoloolithid from Río Negro (Arg) (2)	Subspherical	17.5 - 20	yes	?	yes	both	2.7 - 6.4	mean der	more	filispherulitic	multicanalitucalte	rounded	yes/no
Faveoloolithid from Río Negro (Arg) (3)	Spherical to subspherical	21	yes	yes	yes	dichotomic	3.9 - 6.7	mean der	more	filispherulitic	multicanalitucalte	rounded	yes/no
Faveoloolithid from La Pampa (Arg) (4)	Spherical to subspherical	18	yes	?	yes	both	4 - 6	mean der	more	filispherulitic	multicanalitucalte	both	yes/no
Sphaerovum erbeni from Uruguay (5)	Spherical to subspherical	15 - 20.6	yes	?	?	?	4 - 5	?	?	?	?	both?	?
Sphaerovum erbeni from Uruguay (6)	Spherical to subspherical	17	yes	?	yes	dichotomic	4.2 - 5.1	mean der	more	filispherulitic	multicanalitucalte	both	yes/no
Faveoloolithus sp. from Korea (7)	Spherical to subspherical	15 - 20	no, smooth outer surface	?	yes	both	1.33 – 2.1	mean der	one/more	filispherulitic	multicanalitucalte	?	yes
Faveoloolithidae (8)	Spherical to subspherical	14 - 20	no, smooth or slightly rough	?	yes	both	1.6 - 3.1	mean der	one/more	filispherulitic	multicanalitucalte	?	yes

Supplementary Table S1 | Comparison between the Sanagasta faveoloolithid material and other know locations with well-defined faveoloolithid material. (1) Ref. 44. (2) Ref. 45. (3) Ref. 46. (4) Ref. 40. (5) Ref. 47. (6) Ref. 48. (7) Ref. 37. (8) Ref. 49.

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