more diverse than previously reported and well comparable to the Tonian Liulaobei and Gouhou assemblages in the Xuhuai region. Particularly, the occurrence of *T. aimika*, *T. botula*, *G. bispinosa*, *J. solubila* and *P. rugosus* indicates a late Mesoproterozoic to Tonian age for the Tongjiazhuang Formation. In addition, the occurrences of macroscopic carbonaceous compressions, including a *Chuaria-Tawuia* assemblage from the Tongjiazhuang Formation and *Tawuia* and *Sinosabellidites* from the Shiwangzhuang Formation, are consistent with geochronological data (youngest detrital zircon ages of 1063 Ma and a Rb-Sr whole rock isochron age of 910.2 Ma), suggesting a Tonian age for the Tongjiazhuang, Fulaishan, and Shiwangzhuang formations of the middle and upper Tumen Group, while the Heishanguan and Erqingshan formations of the lower Tumen Group are likely late Mesoproterozoic to Tonian in age. Thus, available biostratigraphic data, lithostratigraphic correlation, and geochronological data suggest that the whole Tumen Group is late Mesoproterozoic to Tonian in age, rather than Cryogenian or Ediacaran. Our study confirms the existence of the 'Great Unconformity' in western Shandong, between the upper Mesoprotoerozoic to Tonian Tumen Group (represented by the Tongjiazhuang Formation at the Tangtou section or the Shiwangzhuang Formation in some other areas of western Shandong) and the lower Cambrian Liguan Formation. This study significantly improves our knowledge about the diversity of the Tonian biosphere.

Cloudinids surviving the Ediacaran-Cambrian transition

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Cloudina is an iconic fossil of the terminal Ediacaran skeletal fauna, but its phylogenetic affinity remains unclear. *Cloudina* is known to have demised at the Ediacaran/Cambrian boundary, and thus often considered as an index taxon of the terminal Ediacaran. *Cambroctoconus* is an octoradial cup-shaped animal occurring from the Cambrian Series 2 to Miaolingian of Greenland, Kyrgysztan, China and Korea. It was originally reported as a stem-group cnidarian, but a possibility of this animal being related to crown-group octocorals has been suggested. A recent study revealed that *Lipopora* and *Tretocylichne* from the Cambrian Stage 4 and Stage 5, respectively, of Australia are also closely related to *Cambrocotocus*, implying a remarkable radiation of this octoradial animal group during the Cambrian. A new observation using MicroCT shows that *Lipopora* has a funnel-in-funnel shaped morphology which is reminiscent of *Cloudina*. Interestingly, a newly-recognized growth mode of *Cambroctoconus* also produced a funnel-in-funnel shape. This may indicate that *Cloudina* did survive the Ediacaran-Cambrian boundary, and gave rise to octoradial cup-shaped animals in the Cambrian.

Revisiting the Ediacaran-Cambrian boundary in the Ossa-Morena Zone (SW Iberia)

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Some of the best outcrops of Iberia to study the Ediacaran-Cambrian boundary are located in the Ossa-Morena Zone. In the Crato-Campo Maior region (SW Iberia, Portugal), this stratigraphic boundary is marked by an angular unconformity (Gonçalves, 1971). The Ediacaran sedimentary rocks of the Série Negra Group (maximum depositional age of c. 545 Ma; Linnemann *et al.,* 2008) are overlain by Early Cambrian strata. A folded foliation has been recognized in the Ediacaran metagreywackes, metapelites, black metachert, marbles and metabasic rocks (Pereira & Silva, 2002).

This deformation event is previous to the intrusion of c. 526-525 Ma granitic rocks (Barquete and Barreiros plutons; Pereira *et al.,* 2011; Sánchez-García *et al.,* 2013), and is not represented in the uncon-formable overlying Early Cam-brian strata including sandstone (maximum depositional age of c. 532 Ma; Pereira *et al.,* 2011). At the base of the lower Cambrian stratigraphic section there is the Freixo-Segóvia volcanosedimentary complex consisting of felsic tuff interbedded with conglo-merate and rhyolitic-dacitic lava flow (Pereira *et al.,* 2006). The conglomerate is composed of pebbles of volcanic rock (basalt, rhyolite, dacite and mafic and

felsic tuff), granitic rocks, chert, quartzite, arkosic sandstone, greywacke and shale in a tuffaceous sandy matrix. This volcano-sedimentary complex is overlain by a sequence of sandstone and shale passing vertically to limestone beds which have been attributed to the lower Cambrian (Pereira *et al.,* 2006) (see Fig. 12). An ongoing research project intends to date the volcanic rocks of the volcano-sedimentary complex using U-Pb zircon geochronology. The absolute dates determined from these volcanic rocks will provide the time framework for the calibration of the existing stratigraphic scheme based on regional correlation.

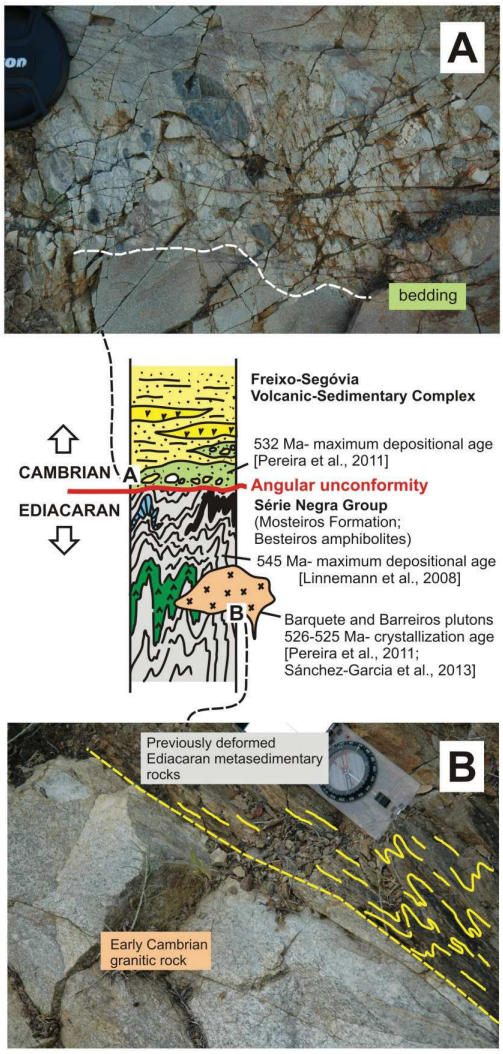

Figure 12.—Ediacaran-Cambrian stratigraphic section of the Ossa-Morena Zone (Crato-Campo Maior region, Portugal). A- Volcaniclastic conglo-merate is interbedded with sandy tuff beds (Early Cambrian Freixo-Segóvia Volcanic-Sedimentary Com-plex); B- Deformed metapelite (Edia-caran Série Negra Group) is cross-cut by a granitic rock (lower Cam-brian Barreiros pluton).

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Was the earliest deformation found in the Central-Iberian Zone Ediacaran Series solely caused by the Cadomian orogeny?

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In the Central-Iberian Zone, the earliest deformation event found in the Ediacaran Series (i.e. Schist Greywacke Complex) is not represented in the unconformable overlying Early Ordovician strata. Traditionally there have been distinct views to explain the occurrence of this deformation, whose age is still uncertain. Some authors argue that the earliest deformation was caused by a Late Ediacaran contractional event (i.e. Cadomian; Talavera *et al*., 2012). The angular unconformity that separates the Lower and Upper Alcudian units has been regarded as evidence for a folding event without developing cleavage (Ortega Gironés & González Lodeiro, 1986; Palero, 1993). Other researchers believe that the earliest deformation was probably formed by rotational block faulting during a Cambro-Ordovician extensional event (Pereira *et al*., 2012). The abrupt changes in the thickness of the Ordovician basal units that overlain the Schist-Greywacke Complex are typical of deposition in extensional graben-horst systems (McDougall *et al*., 1987; Dias da Silva *et al*., 2015).

In the Cáceres region (Central Extremadura Batholith) the first cleavage observed in the Ediacaran Series has been attributed almost exclusively to Late Paleozoic (i.e. Variscan) deformation events which erased previous structures (Tena-Dávila Ruiz *et al*., 1980). However, towards the southeast, in the Miajadas-Navalvillar de Pela region, it has been described as the earliest deformation in the Ediacaran Lower Alcudian unit. Still, doubts persist about the age of the earliest deformation that for some authors corresponds to gently folding developed