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Mángano, Buatois, Astini and Rindsberg– Intertidal trilobite trace fossils - List of supplementary materials:

Sup. Mat. 1. Figure DR1. Desiccation cracks in tidal-flat deposits of the Rome Formation.

Sup. Mat. 2. Table DR1. Selected occurrences of trilobite trace fossils in intertidal deposits

References

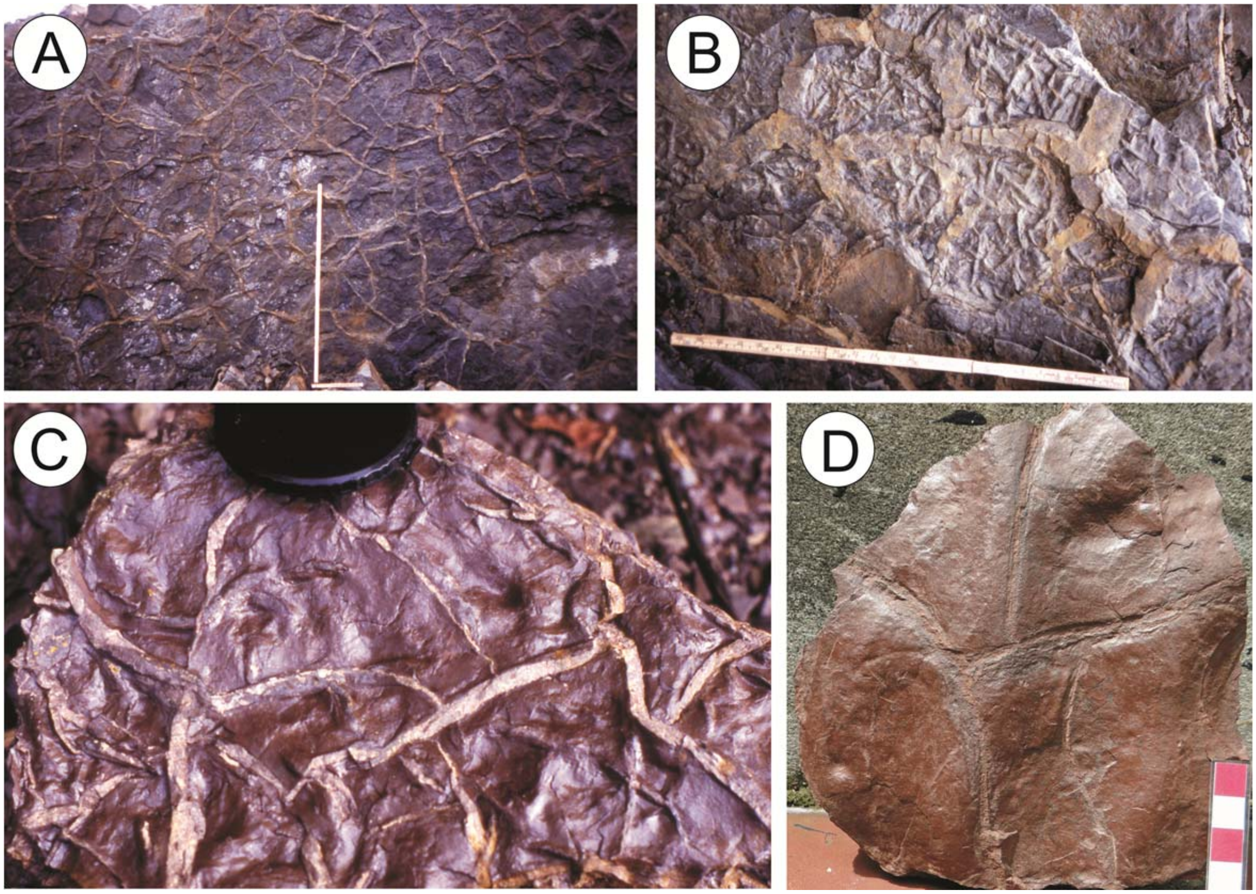

Figure DR1. Desiccation cracks in tidal-flat deposits of the Rome Formation. A. General view. B. Close-up showing several generations of desiccation cracks. C. Close-up showing morphological details and orthogonal angles. Lens cap is 5.5 cm wide. D. Desiccation cracks overprinting ripple surface. Scale bar is 2 cm long. Desiccation cracks in are V-shaped in cross section and displays connected rectilinear polygonal patterns in plane view. Recurrent desiccation cracks of incremental sizes suggest increased dehydration of the cohesive substrate due to progressively more prolonged exposures during neap-spring cycles.

AGE	TRACE FOSSILS	SEDIMENTOLOGIC CHARACTERISTICS	SEDIMENTARY ENVIRONMENT	UNIT	COMMENTS	REFERENCE
Cambrian Stages 2 to 3	*Cruziana brannae, C. fasciculata, C. plicata, C. pormensis, Cruziana* isp., *Diplichnites* isp., *Monomorphichnus lineatus, Monoorphichnus* isp., *Rusophycus bonnarensis, R. carinatus, R. cerecedensis, R. leonensis, R. transversensis, Rusophycus* isp.	Heterolithic facies. Flaser, wavy and lenticular bedding. Herringbone cross-stratification, desiccation cracks, planar cross-bedding, current and wave ripple cross-lamination, and parallel lamination.	Lower intertidal sand flat to upper intertidal mud flat and tidal channels	Herrería Formation (Spain)		Crimes et al. (1977)
Cambrian Stages 2 to 3	*Monomorphichnus lineatus, Monomorphichnus i*sp., *Rusophycus* isp.	Heterolithic facies. Flaser, wavy and lenticular bedding. Herringbone cross-stratification, desiccation cracks, planar cross-bedding, current and wave ripple cross-lamination, and parallel lamination.	Lower intertidal sand flat to upper intertidal mud flat and tidal channels	Cándana Quartzite (Spain)	Tidal-flat deposits stacked forming fining-upward parasequences.	Crimes et al. (1977)
Cambrian Stages 3 to 4	*Diplichnites* isp., *Dimorphichnus* isp., *Rusophycus carbonarius*	Heterolithic facies. Flaser and wavy bedding. Syneresis and desiccation cracks, wrinkle marks, current and wave ripple cross-lamination, interference ripples and mudstone intraclasts.	Lower intertidal sand flat to upper intertidal mud flat	Lake Oesa Member of the St Piran Formation	Tidal-flat deposition is associated with a forced regression.	Desjardins et al. (2012)
Cambrian Stage 4 to Cambrian Series 3.	*Cruziana problematica, Diplichnites* isp., *Rusophycus carbonarius, R. leifeirikssoni, Rusophycus* isp.	Heterolithic facies. Flaser and wavy bedding. Syneresis cracks, wrinkle marks, current and wave ripple cross-lamination, ripple patches, interference ripples and flat-topped ripples.	Lower intertidal sand flat to middle intertidal mixed flat	Campanario Formation (Argentina)	Tidal-flat deposits typically occur above subtidal sandbodies forming fining-upward parasequences.	Mángano & Buatois (2004)
Cambrian Series 3	*Cruziana problematica, Diplichnites* isp., *Dimorphichnus* cf. *D. obliquus, Rusophycus carbonarius, Rusophycus* isp.	Heterolithic facies. Wrinkle marks, current and wave ripple cross-lamination, and parallel lamination.	Tidal flats interfingering with a braided delta	Haneh Member of the Burj Formation and Umm Ishrin Formation (Jordan)	Some of these ichnotaxa also occur in the underlying delta-front deposits. Stratal pattern indicates forced regression.	Selley (1970); Makhlouf & Abed (1991); Amireh et al (1994); Hofmann et al. (2012); Mángano et al. (2013)
Cambrian Series 3	*Cruziana barbata, Rusophycus ramellensis*	Heterolithic facies. Wavy and lenticular bedding. Herringbone cross-stratification., desiccation cracks, current and wave ripple cross-lamination, and parallel lamination.	Lower intertidal sand flat to middle intertidal mixed flat and tidal channels	Oville Sandstone and Shales (Spain)	Bimodal-bipolar paleoecurrents.	Legg (1985)
Cambrian Series 4	*Cruziana omanica, C. semiplicata, C.* cf. *tortworthi, Cruziana* isp., *Monomorphichnus bilinearis,*	Heterolithic facies. Flaser, wavy and lenticular bedding. Herringbone cross-	Lower intertidal sand flat to shallow subtidal.	Pico de Halcón Member of the Santa Rosita Formation	Bimodal-bipolar paleoecurrents.	Mángano et al. (1996)

	Rusophycus carbonarius, R. latus, Rusophycus isp.	stratification., planar cross-bedding, syneresis cracks, current and wave ripple cross-lamination,, and parallel lamination.		(Argentina)		
Cambrian Series 4 to Floian	*Cruziana furcifera, C. goldfussi, C. rugosa, C. semiplicata, Dimorphichnus* isp., *Diplichnites* isp., *Rusophycus* isp.	Heterolithic facies. Flaser, wavy and lenticular bedding. Current and wave ripple cross-lamination.	Middle intertidal mixed flat to upper intertidal mud flat and tidal channels	Cabo Series (Spain)		Baldwin (1977)
Tremadocian to Floian	*Cruziana barriosi, C. furcifera, C. goldfussi, C. rugosa, C. semiplicata, Rusophycus morgati, Rusophycus* isp.	Heterolithic facies. Flaser, bedding. Herringbone cross-stratification., current and wave ripple cross-lamination.	Lower intertidal sand flat to upper intertidal mud flat and tidal channels	Barrios Formation (Spain)	Tidal-flat deposits stacked forming fining-upward parasequences.	Baldwin (1977)
Tremadocian to Floian	*Cruziana billingsi, C. breadstoni, C. furcifera, C. goldfussi, C. problematica, C. rugosa, C. semiplicata, C. tortworthi, C.* ispp., *Dimorphichnus obliquus, Diplichnites [Petalichnus]* ispp., *Monomorphichnus bilinearis, M. intersectus, M. lineatus, M. multilineatus, Monomorphichnus* isp., *Rusophycus biloba, R. crimesi, R. didymus, R. cf. dispar, R. eutendorfensis, R. latus, R. leifeiriksoni, R. morgati, R. cf. pedroanus, R. cf. pudicus, Rusophycus.* ispp., *Trichophycus venosus*	Heterolithic facies. Flaser and wavy bedding. Herringbone cross-stratification, planar cross-bedding, flat-topped ripples, interference ripples, curren ripples and ripple cross-lamination, scours, channels. Wrinkle marks, mudstone intraclasts, load casts, rill marks, and swash marks.	Lower intertidal sand flat to middle intertidal mixed flat	Beach, Ochre Cove and Power Steps formations (Canada)	Upper intertidal and supratidal flats are represented but contain no trilobite trace fossils. Heterolithic middle intertidal flats show the greatest ichnodiversity.	Fillion and Pickerill (1990)
Floian to Darriwilian	*Cruziana furcifera, C. goldfussi, C. rugosa, Dimorphichnus* isp.	Heterolithic facies. Flaser, wavy and lenticular bedding. Desiccation and syneresis cracks, planar cross-bedding, current and wave ripple cross-lamination, and interference ripples.	Lower intertidal sand flat to upper intertidal mud flat	Mojotoro Formation (Argentina)	Tidal-flat deposits typically occur above subtidal sandbodies forming fining-upward parasequences.	Mángano et al. (2001)
Floian to Darriwilian	*C. bagnolensis, C. furcifera, C. lefebvrei, C. rugosa*	Herringbone cross-stratification, reactivation surfaces, wrinkle marks and desiccation cracks.	Tidal flats	Grès Armoricain (France)		Durand (1985)
Katian	*Petalichnus* isp., *Taenidium barrretti*	Siltstone and shale, desiccation cracks, mudstone drapes and mudstone intraclasts.	Upper intertidal mud flat	Ringgold Member of the Sequatchie Formation (USA)		Rindsberg (1983); Martin & Rindsberg (1999)

Table DR1. Selected occurrences of trilobite trace fossils in lower Paleozoic intertidal deposits. *Monomorphichnus* isp., *Diplichnites* isp., *Rusophycus carbonarius* and *Cruziana problematica* are included in the list, but production by other arthropods cannot be completely ruled out. The degree of certainty in the environmental interpretations varies from case to case. However, only examples in which diagnostic structures of intertidal conditions were noted by the authors of each study are included in the table.

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