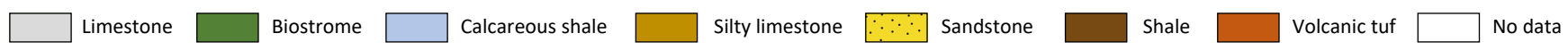
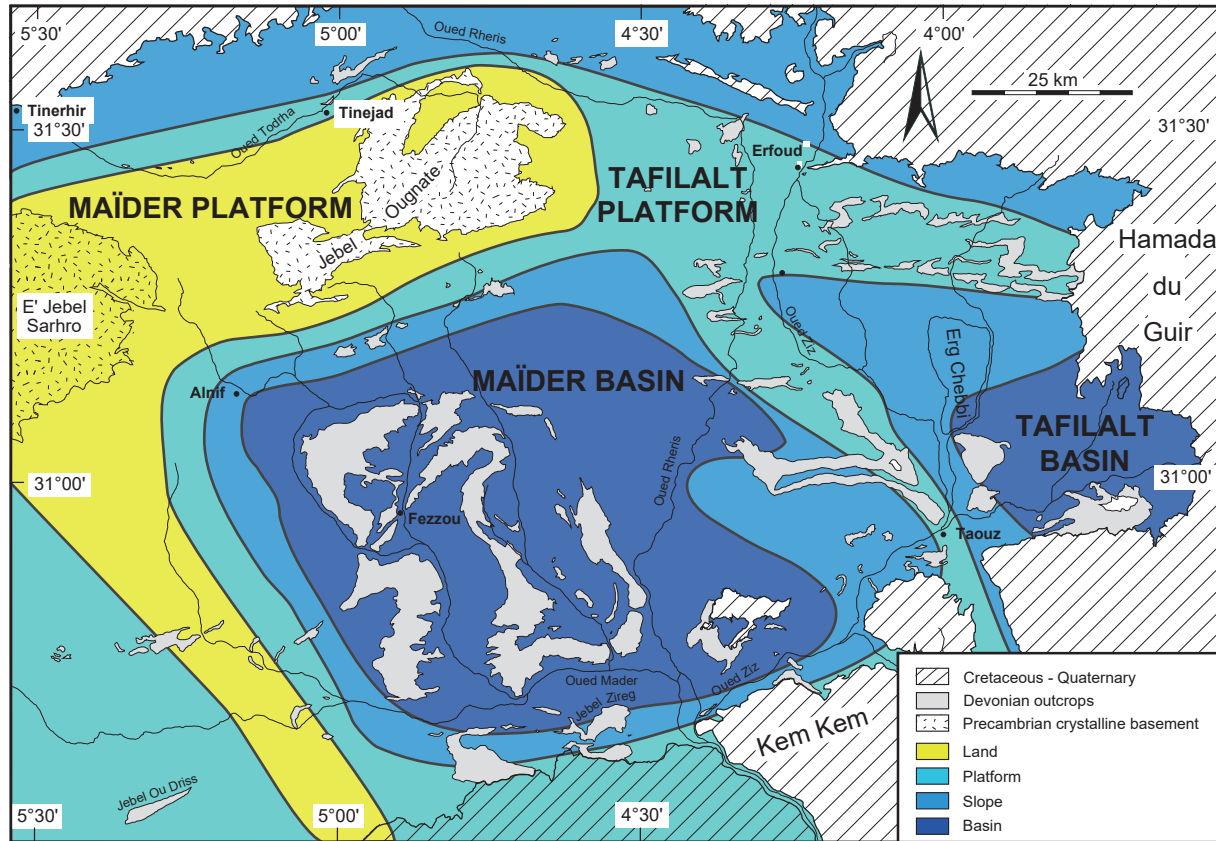
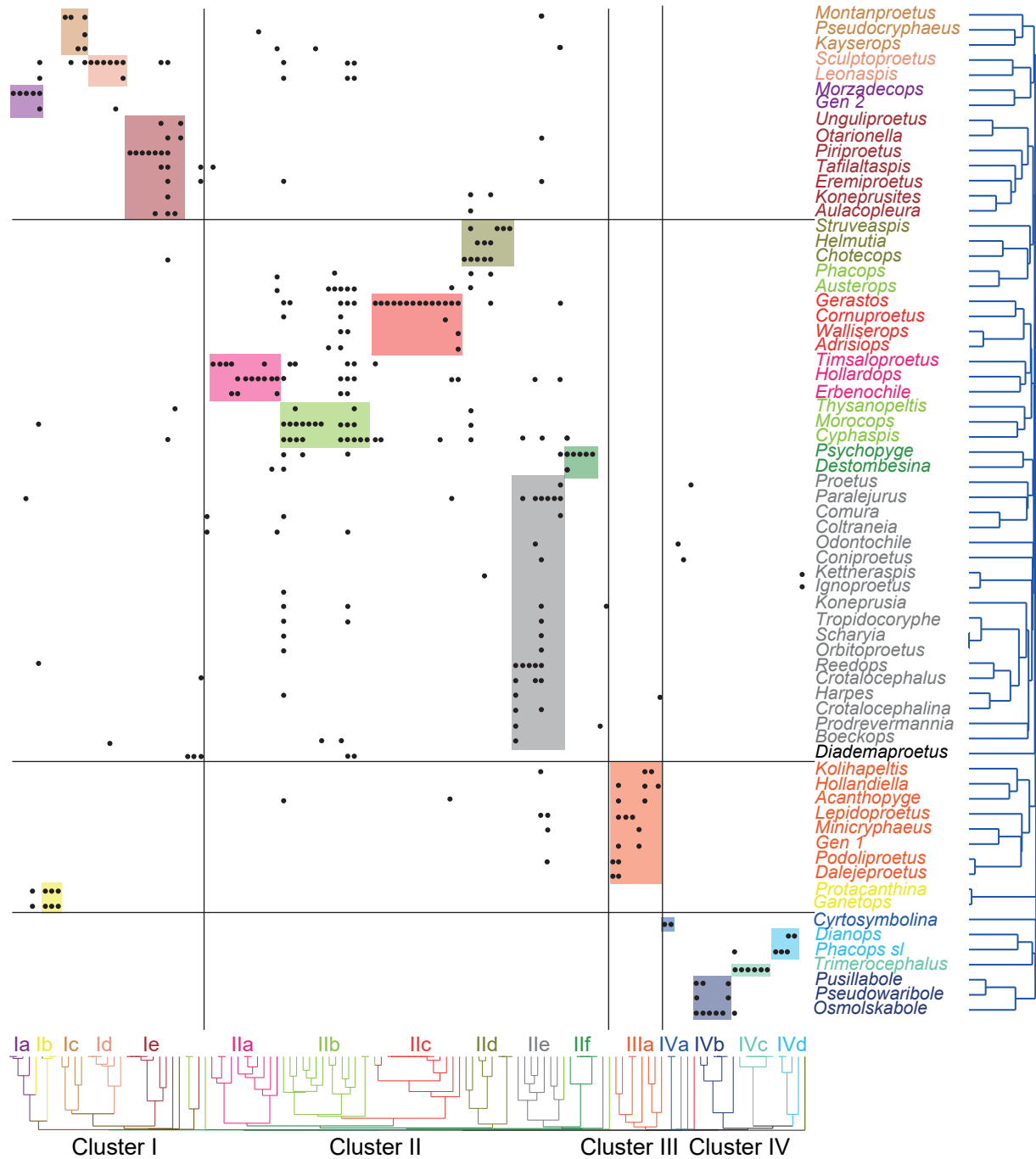


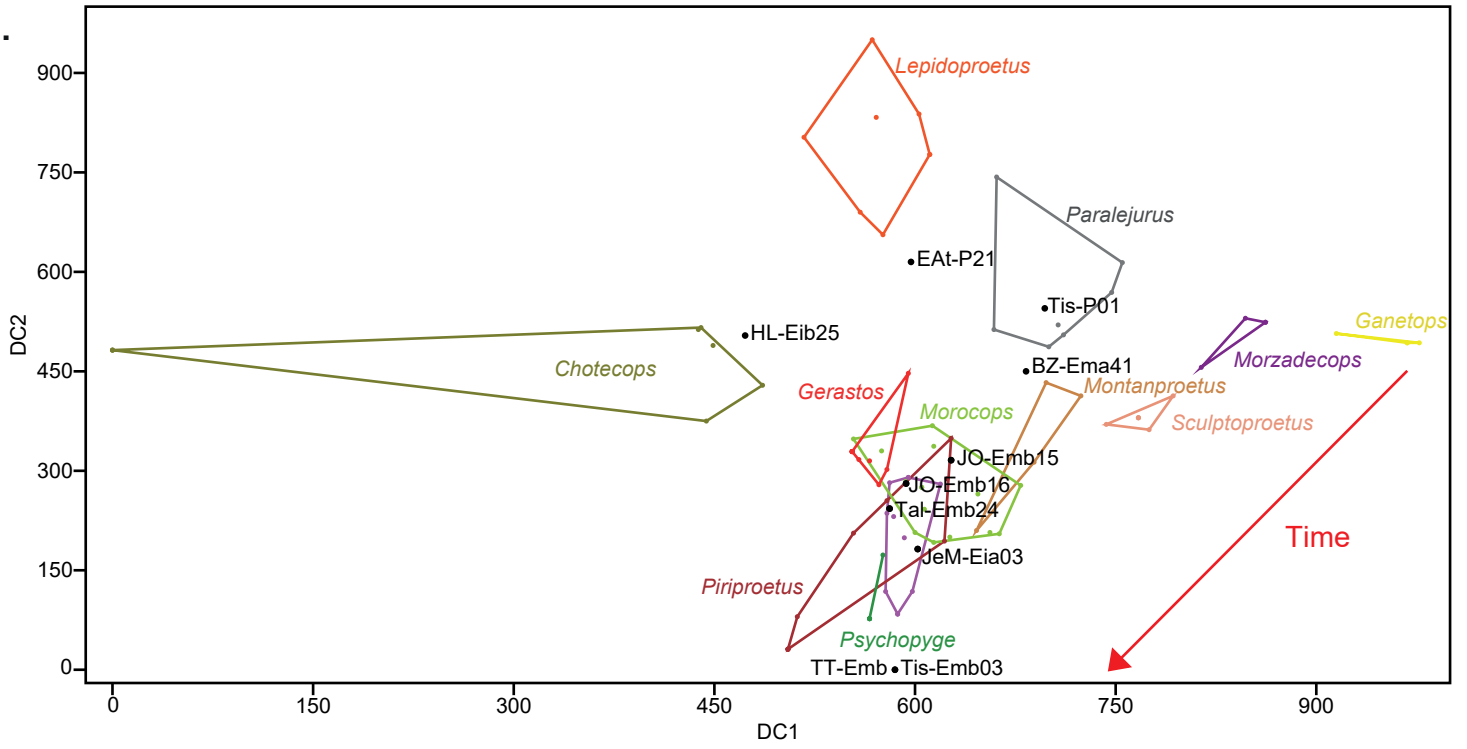
Dominant lithology



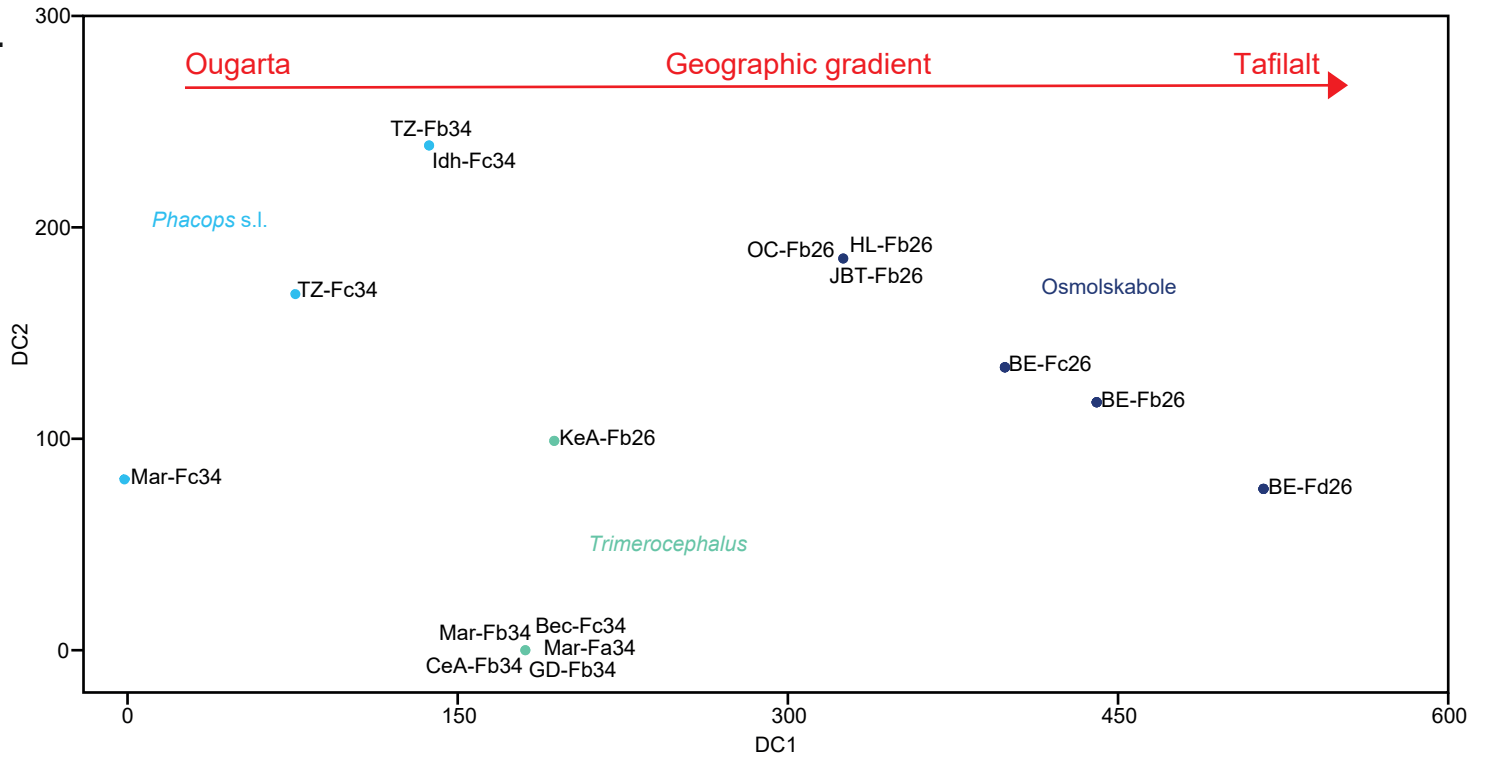




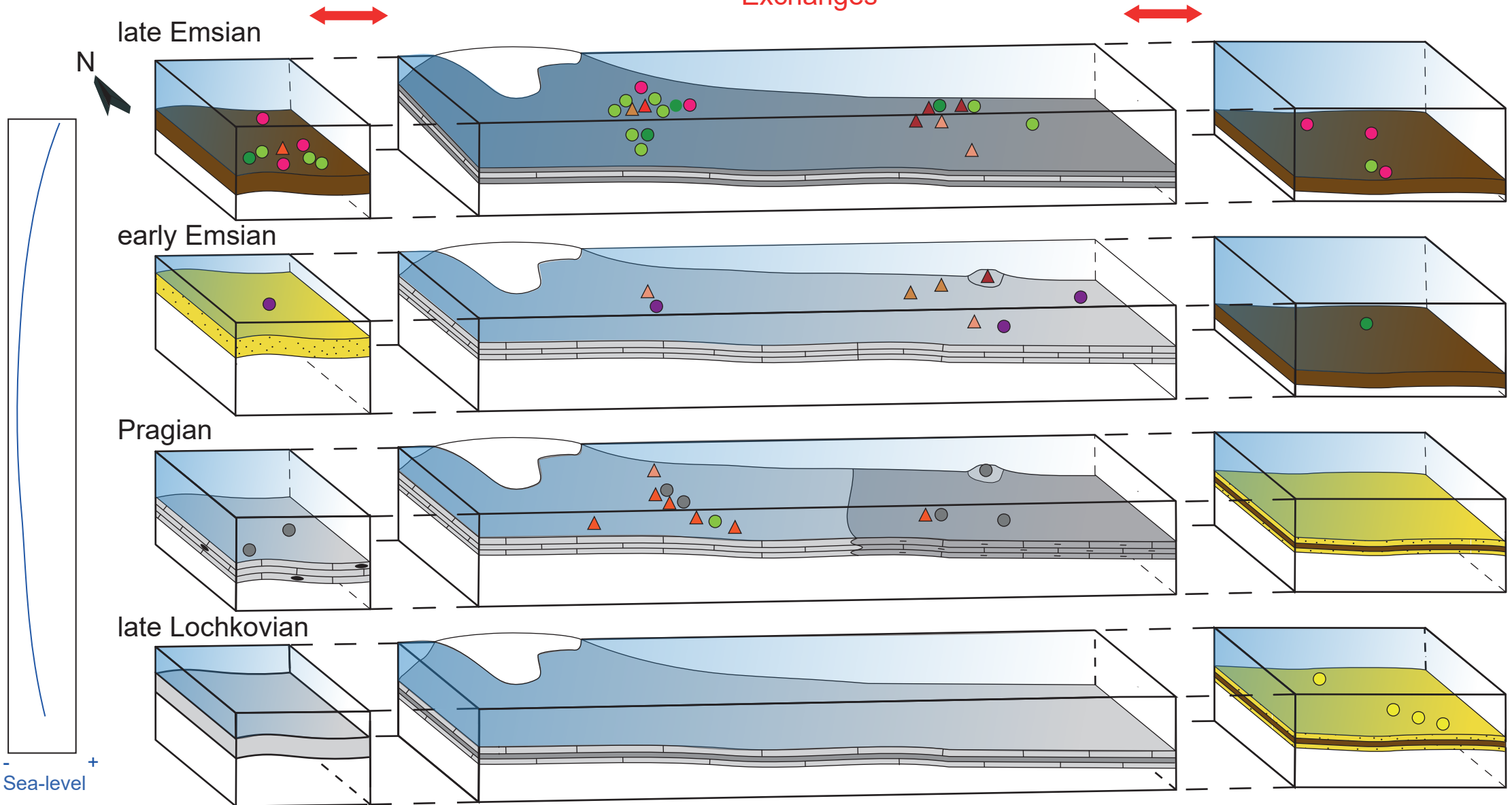
A.



B.



Exchanges





Dra Valley



Maider

Tafilalt

Ougarta

Carbonate deposits












-  Limestone
-  Calcareous shale

-  Marl
-  Nodular limestone

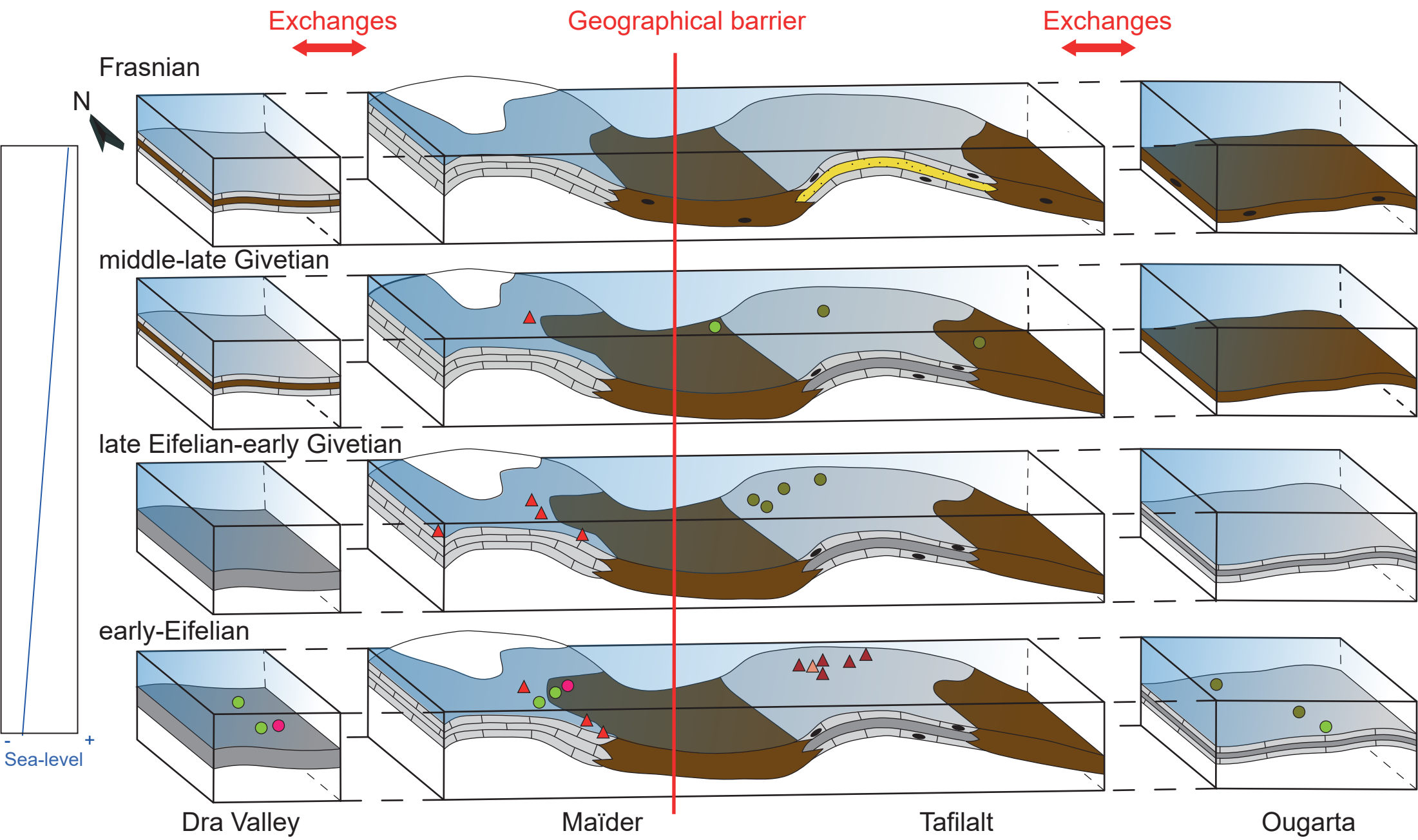
Siliciclastic deposits

-  Sandstone
-  Shale

Trilobite associations

-  *Ganetops*
-  *Morzadecops*
-  *Gerastos*
-  *Piriproetus*
-  *Hollardops*
-  *Paralejurus*
-  *Lepidoproetus*
-  *Sculptoproetus*
-  *Morocops*
-  *Psychopyge*
-  *Montanproetus*

- Sea-level +



Carbonate deposits

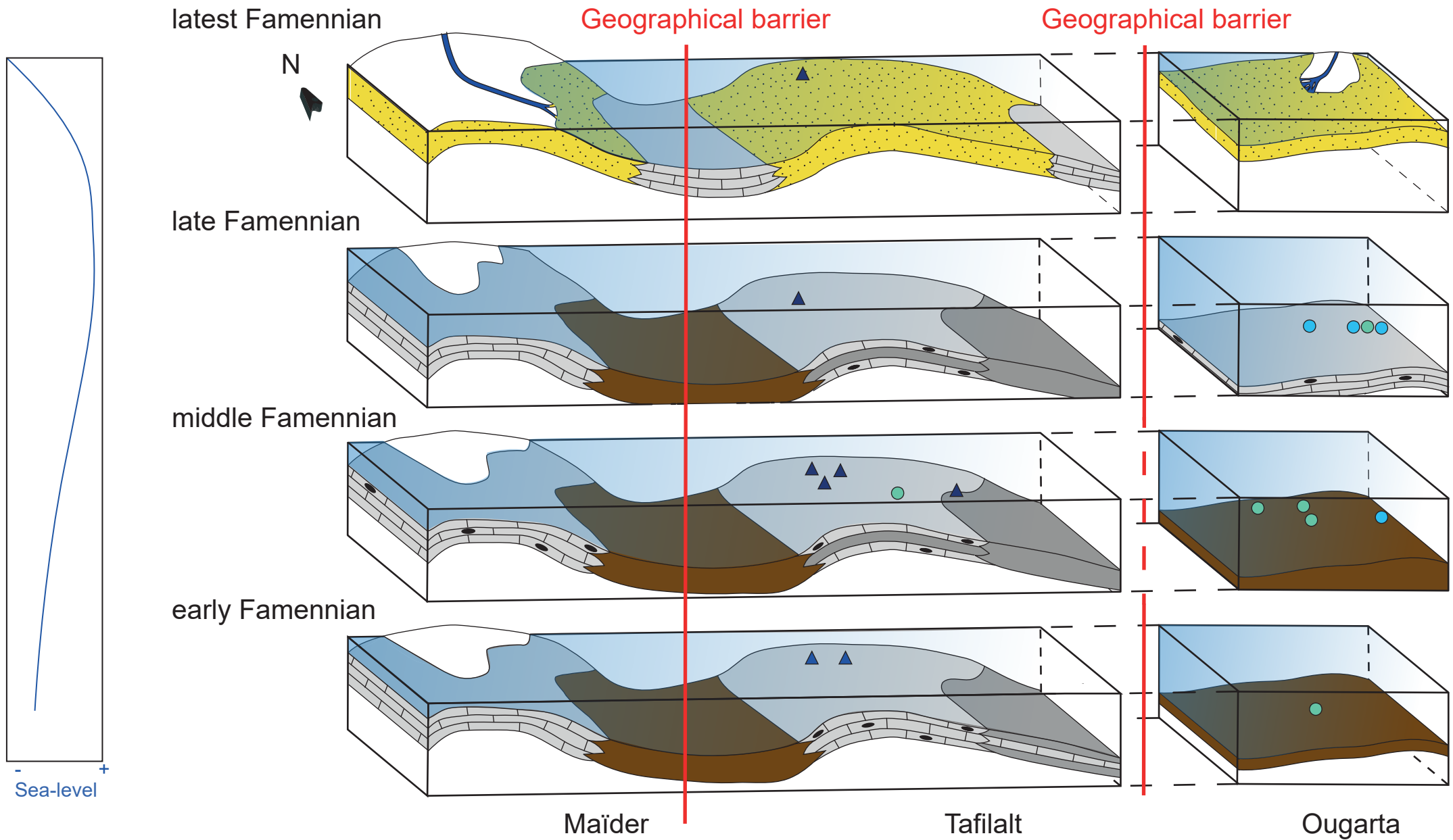
- Limestone
- Marl
- Calcareous shale
- Nodular limestone

Siliciclastic deposits

- Sandstone
- Shale

Trilobite associations

- Chotecops*
- Morocops*
- Piriproetus*
- Hollardops*
- Gerastos*
- Sculptoproetus*



- Sea-level +

Carbonate deposits

Limestone

Calcareous shale

Marl

Nodular limestone

Siliciclastic deposits

Sandstone

Shale

Trilobite associations

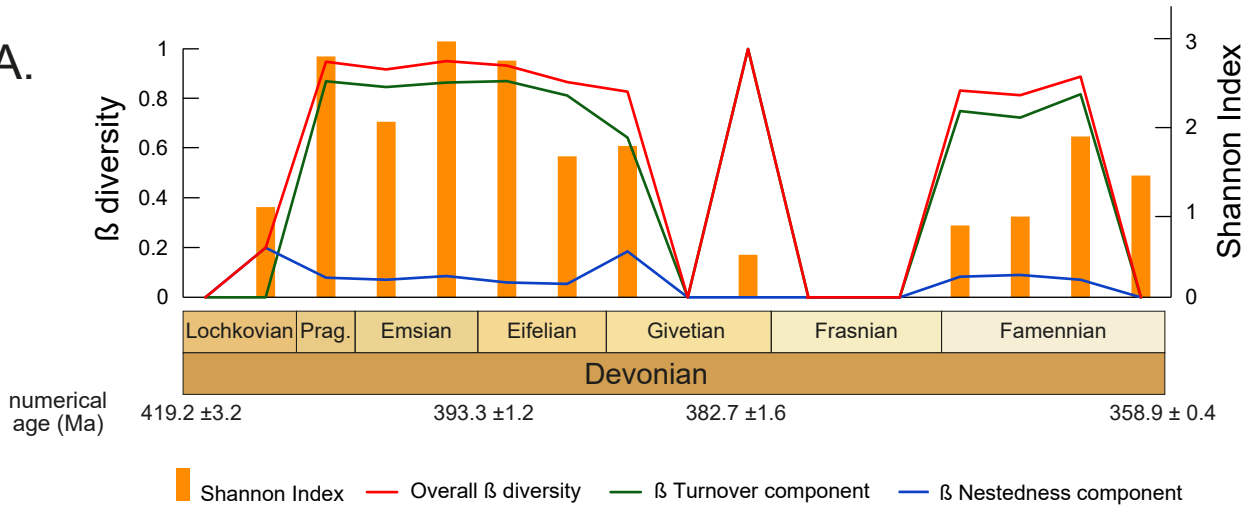
Phacops s.l.

Trimerocephalus

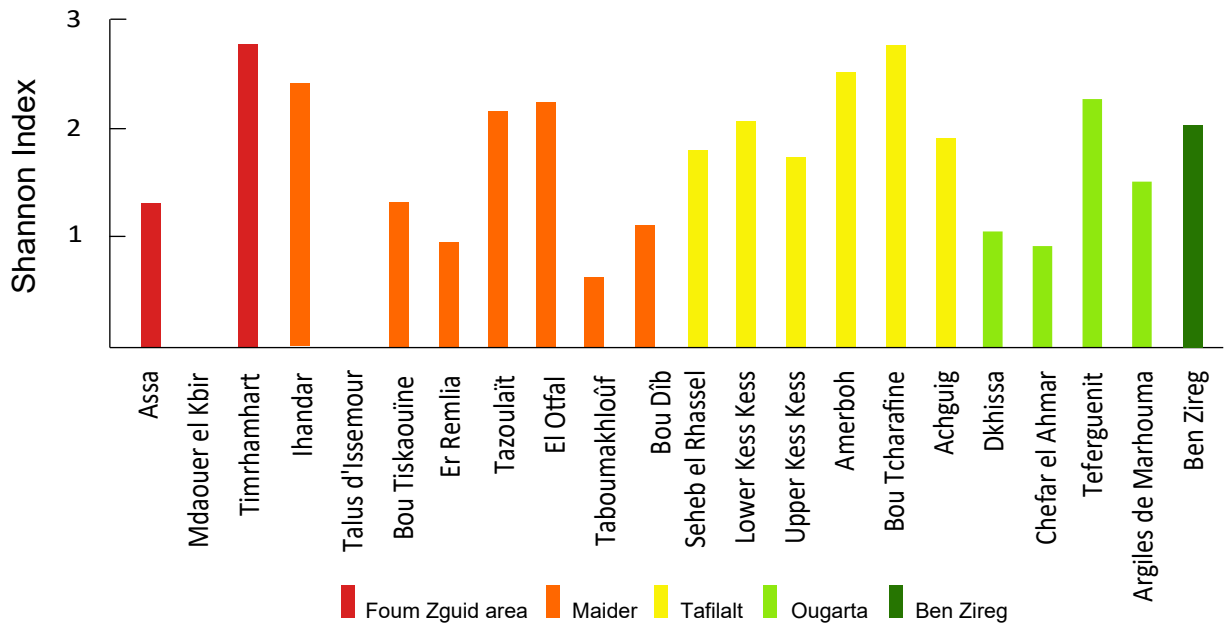
Cyrtosymbolina

Osmolskaboie

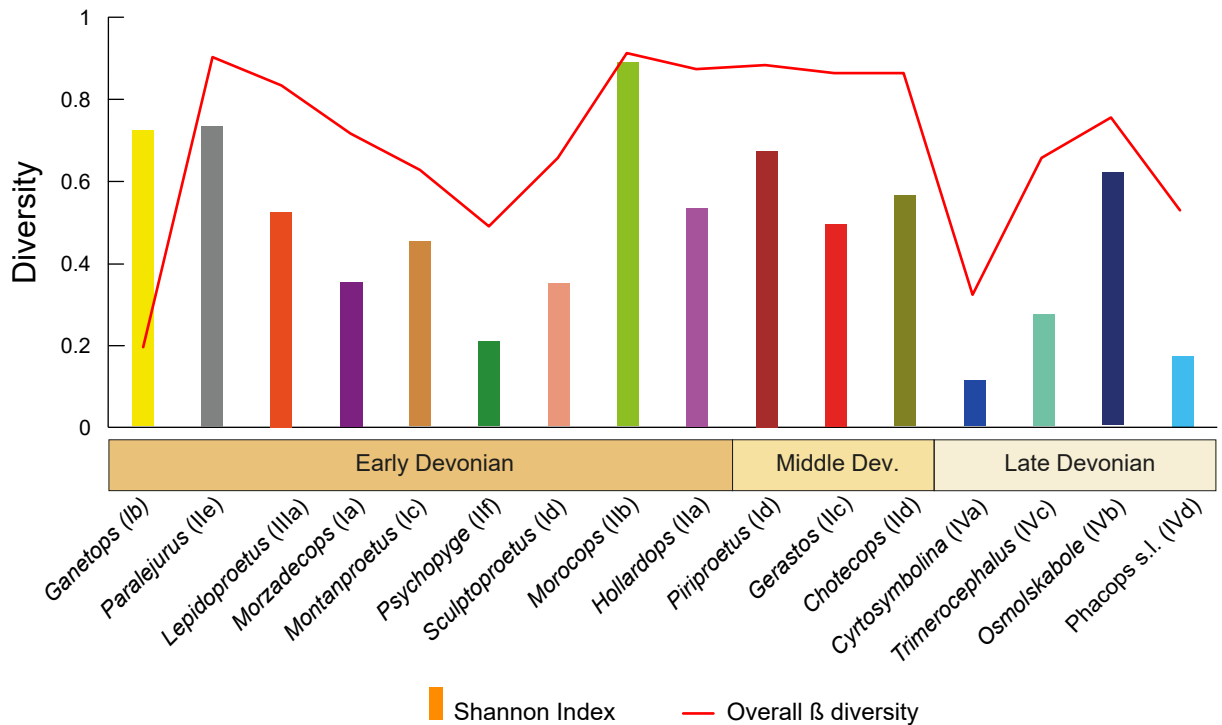
A.



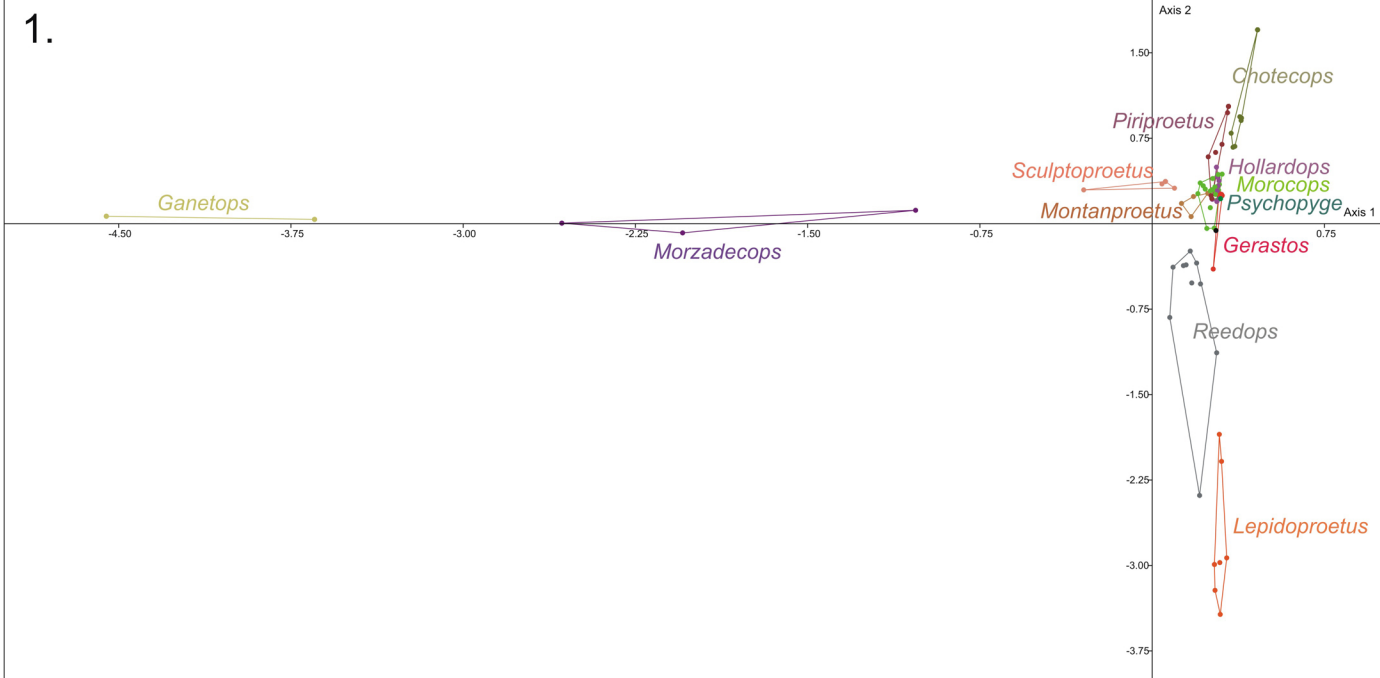
B.



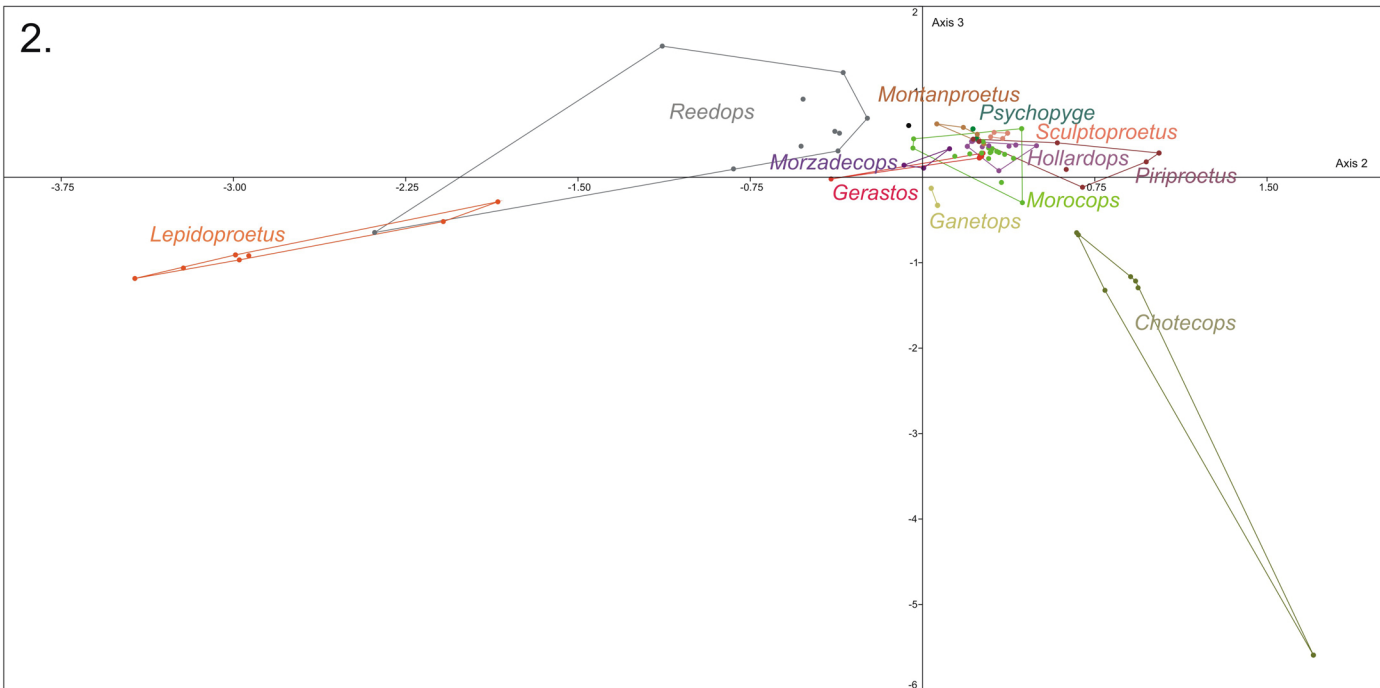
C.

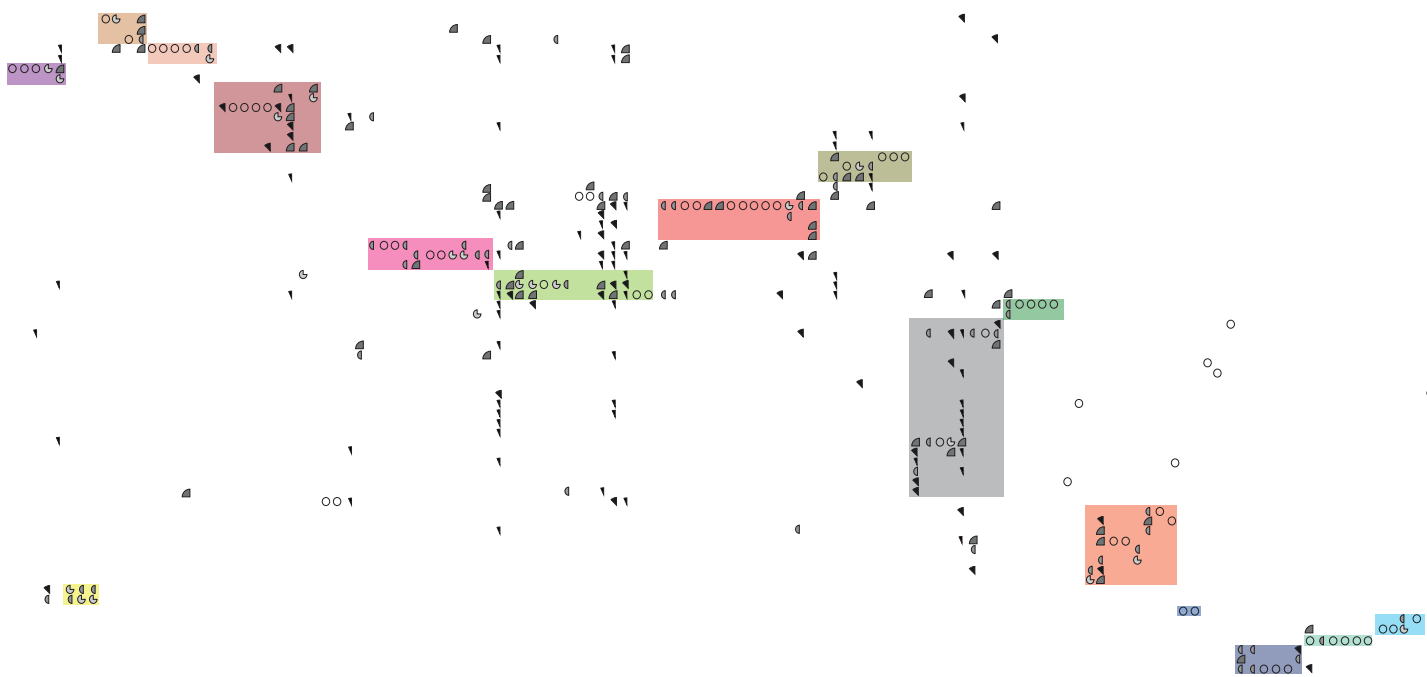


1.

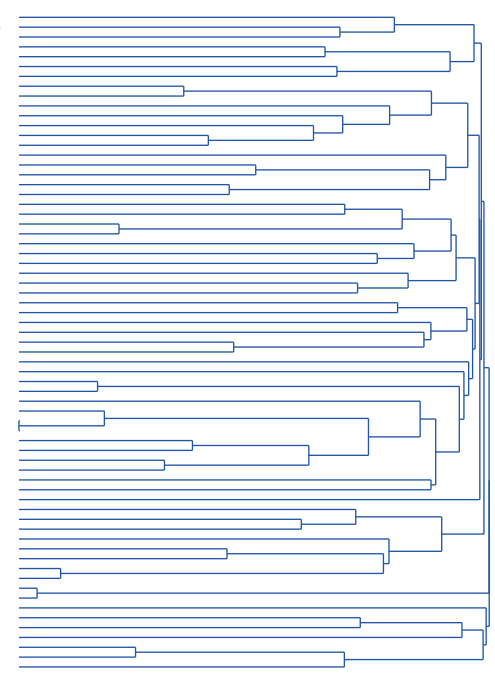


2.

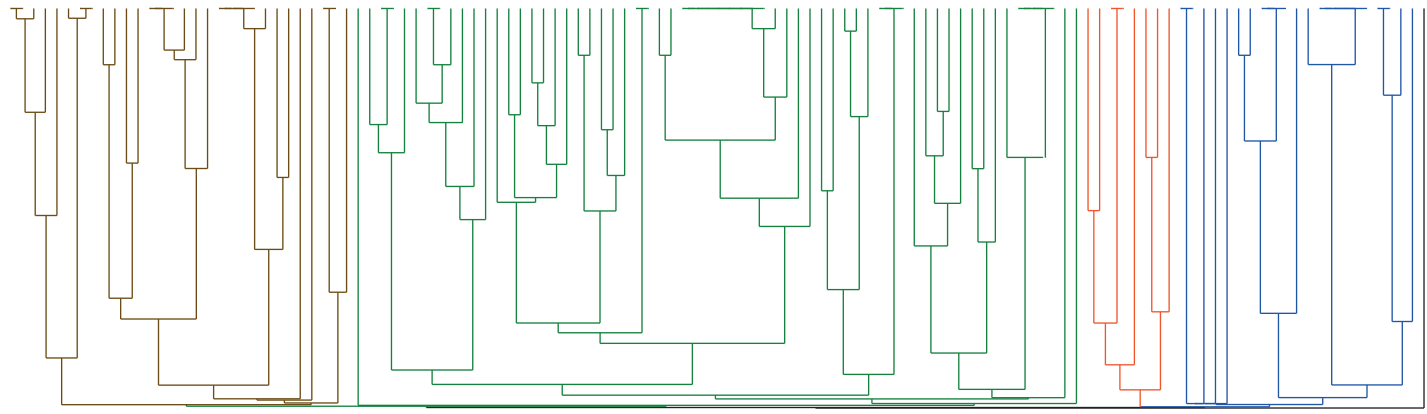




- Montanproetus
- Pseudocryphaeus
- Kaysrops
- Sculptoproetus
- Lionaspis
- Morzedecops
- Gen 2
- Unguliproetus
- Otarionella
- Piriproetus
- Talliataspis
- Eremiproetus
- Xoneproetus
- Aulocoptera
- Struveaspis
- Helmutia
- Chotecops
- Phacops
- Austropro
- Gerastio
- Comuproetus
- Walliserops
- Adrisops
- Timasoproetus
- Hollardops
- Erbenochile
- Trivastropoetus
- Morocops
- Cypripes
- Psychopyge
- Destombesina
- Piretus
- Parajururus
- Comura
- Coltranea
- Odontochile
- Comiproetus
- Ketneraspis
- Gignoproetus
- Koneprusia
- Tropidocoryphe
- Scharja
- Orbitoproetus
- Reedops
- Crotaloccephalus
- Harpes
- Crotaloccephalina
- Prodevermannia
- Boeckops
- Diademoproetus
- Kolihapellis
- Hollandiella
- Acanthopyge
- Lepidoproetus
- Mincryphaeus
- Gen 1
- Podoliproetus
- Daleiproetus
- Protacanthina
- Calantops
- Cyrtosymbolina
- Dianops
- Phacops cf
- Timoccephalus
- Pustilabile
- Pseudovaribole
- Osmoiskabole

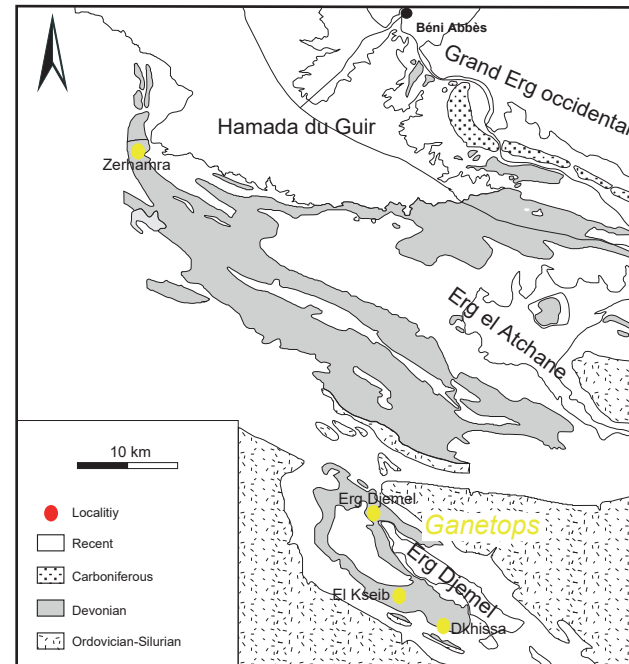
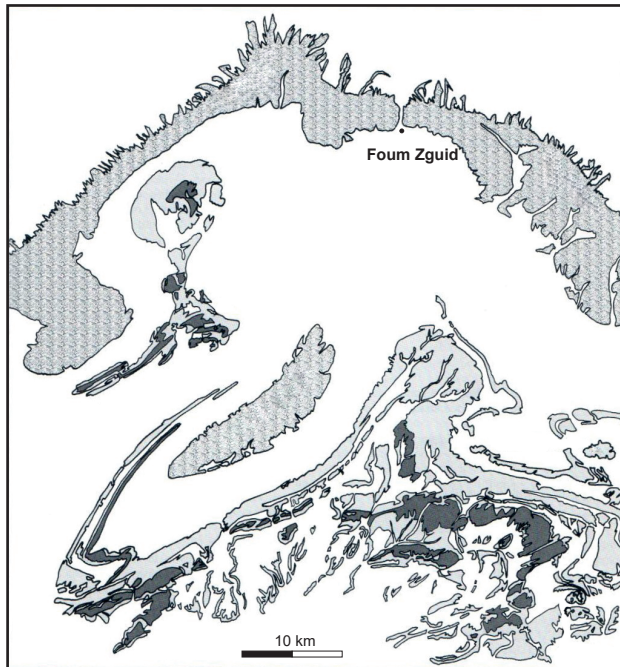
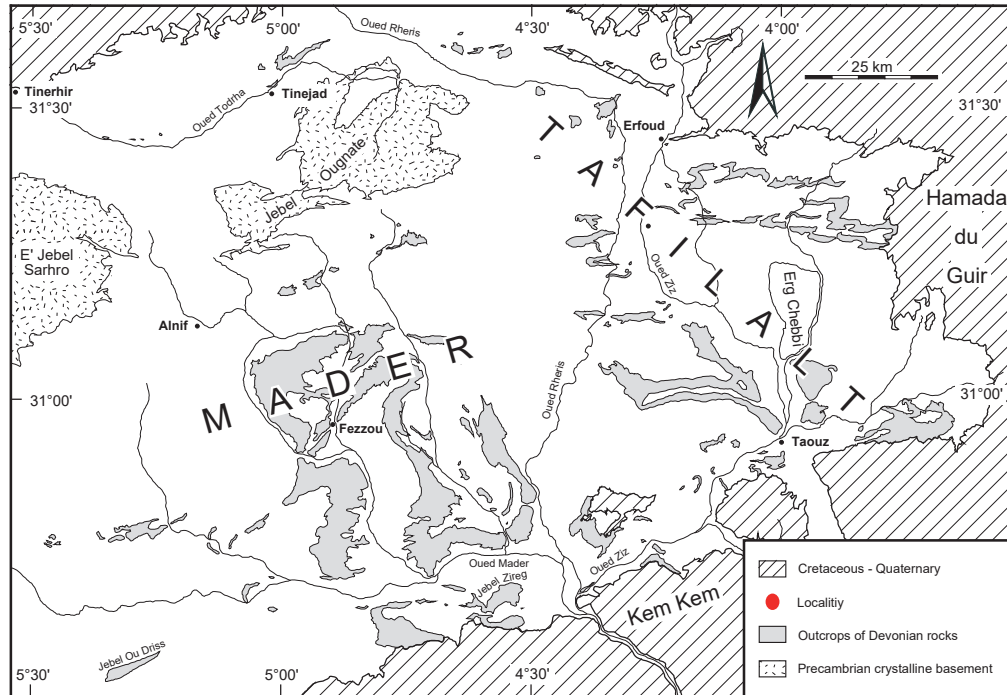


- la JO-Emb12
- lb MeK-Emb02
- lc F12-Emb21
- ld OC-Emb21
- le Dsh-Lb31
- Ila JA-Emb21
- Ilb JA-Emb24
- Ilc JA-Emb24
- Ild JA-Emb24
- Ile JA-Emb24
- Ilf JA-Emb24
- IIIa JA-Emb24
- IVa JA-Emb24
- IVb JA-Emb24
- IVc JA-Emb24
- IVd JA-Emb24

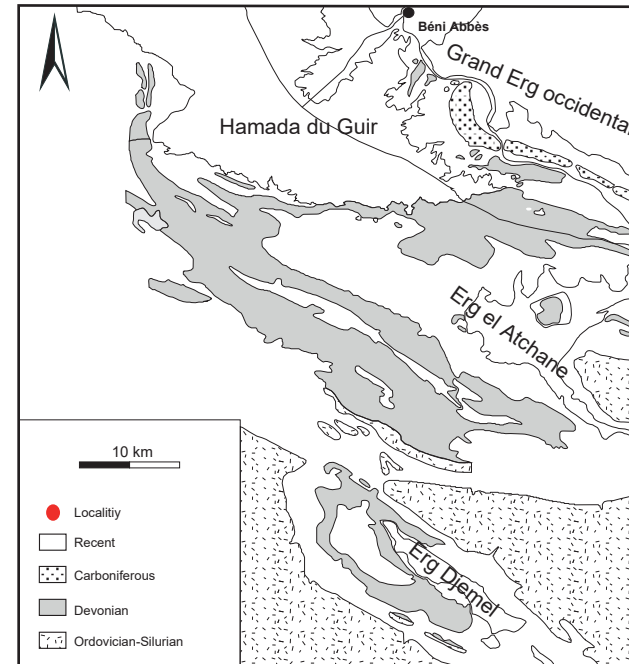
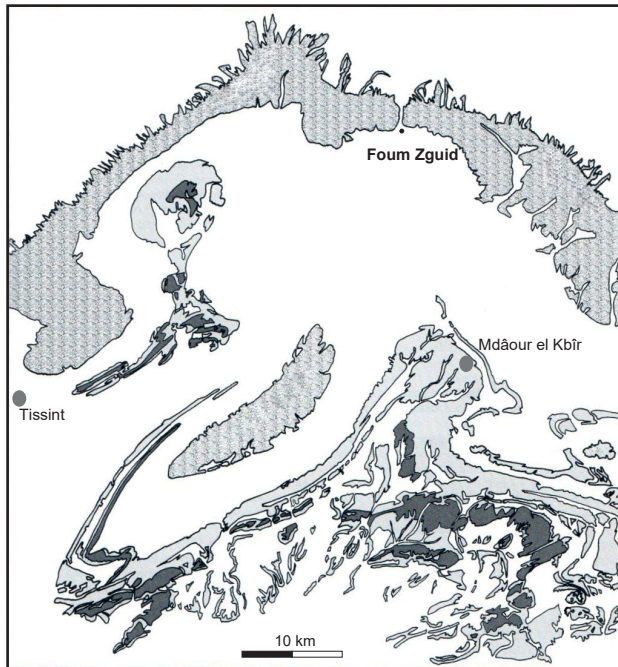
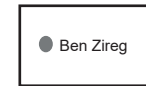
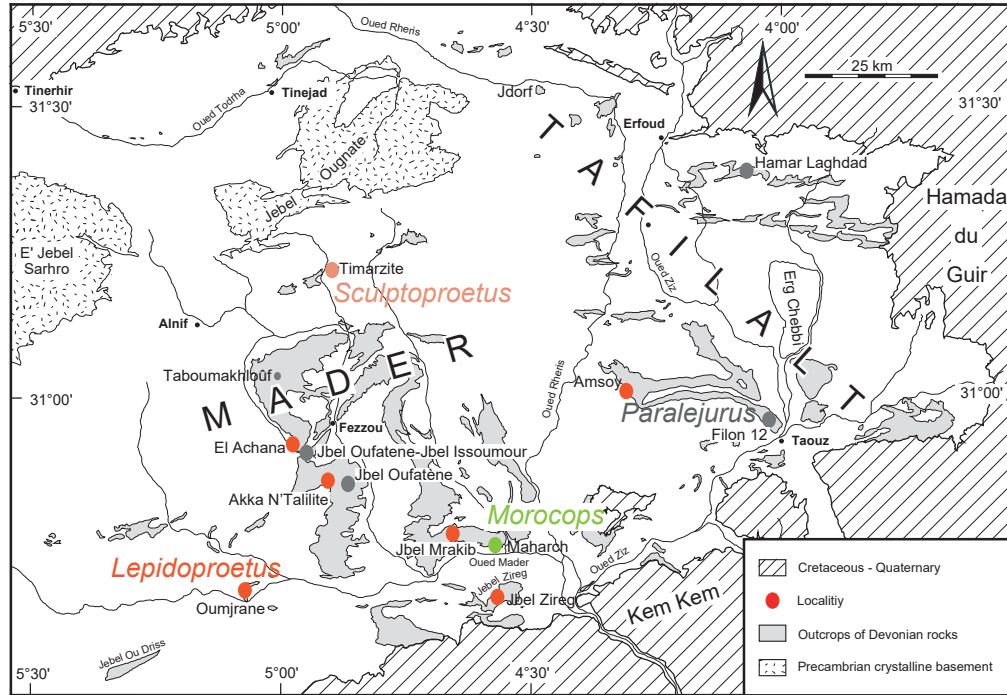


Class	% of specimen
0	0
1	1-5
2	6-10
3	11-25
4	26-50
5	51-75
6	76-100

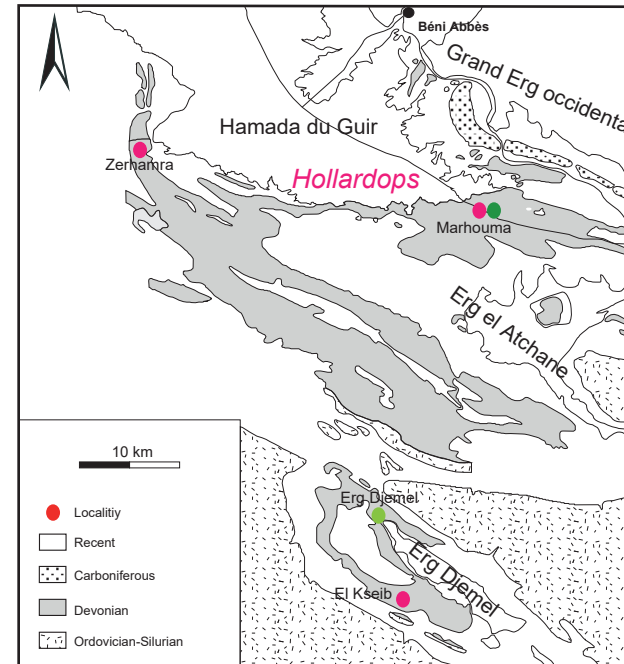
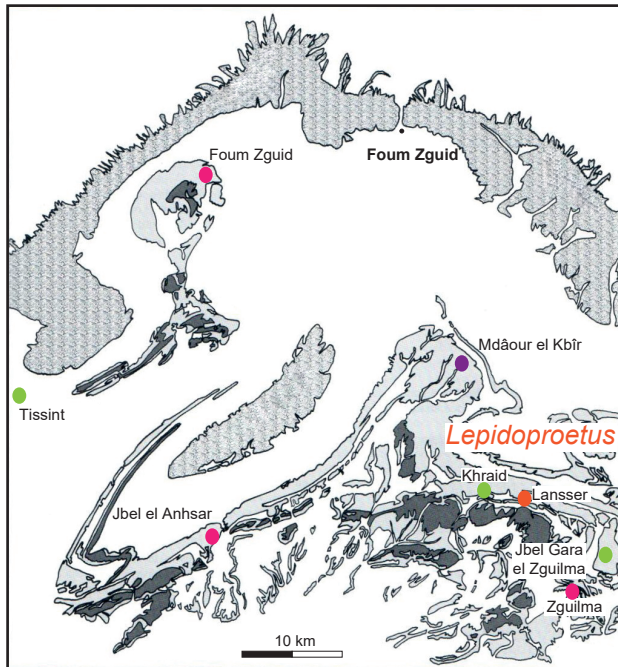
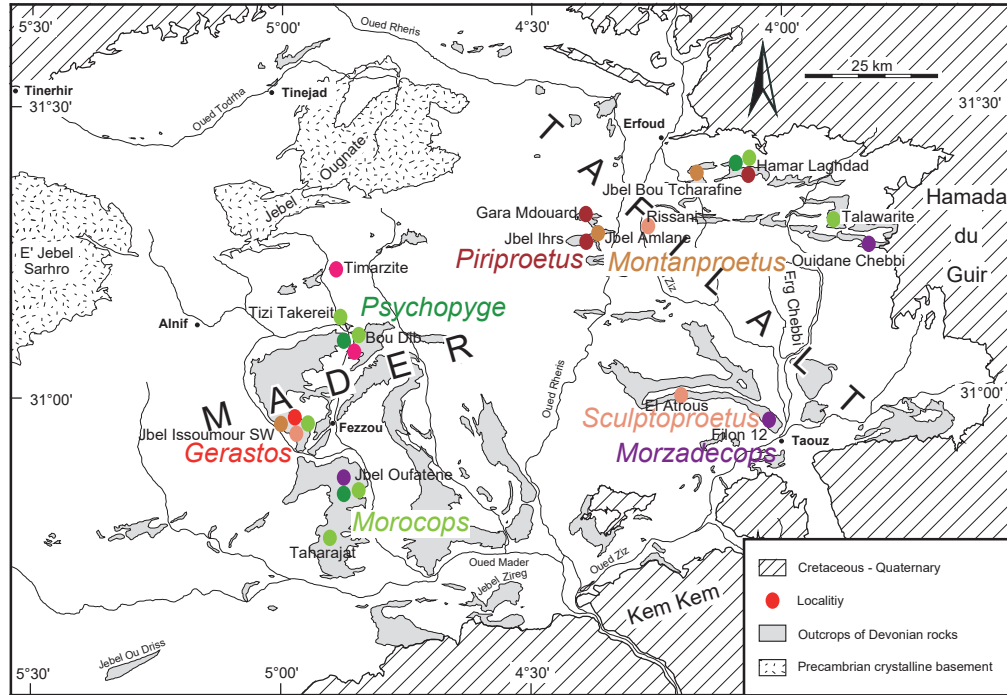
Lochkovian



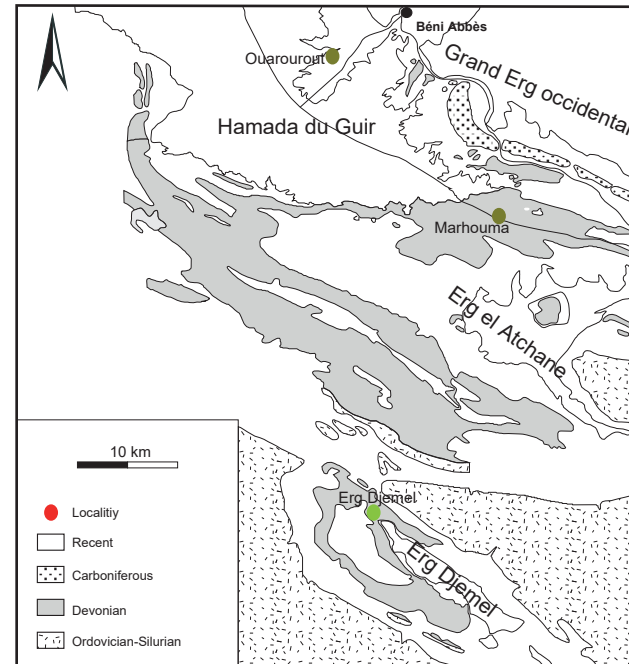
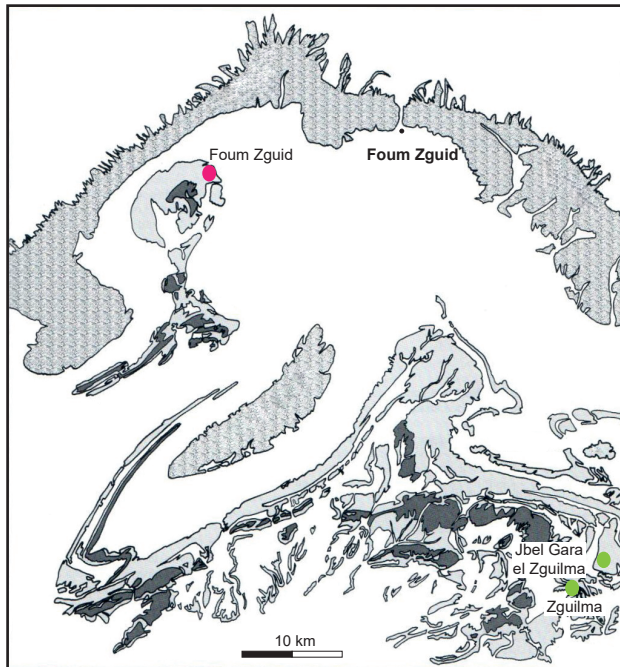
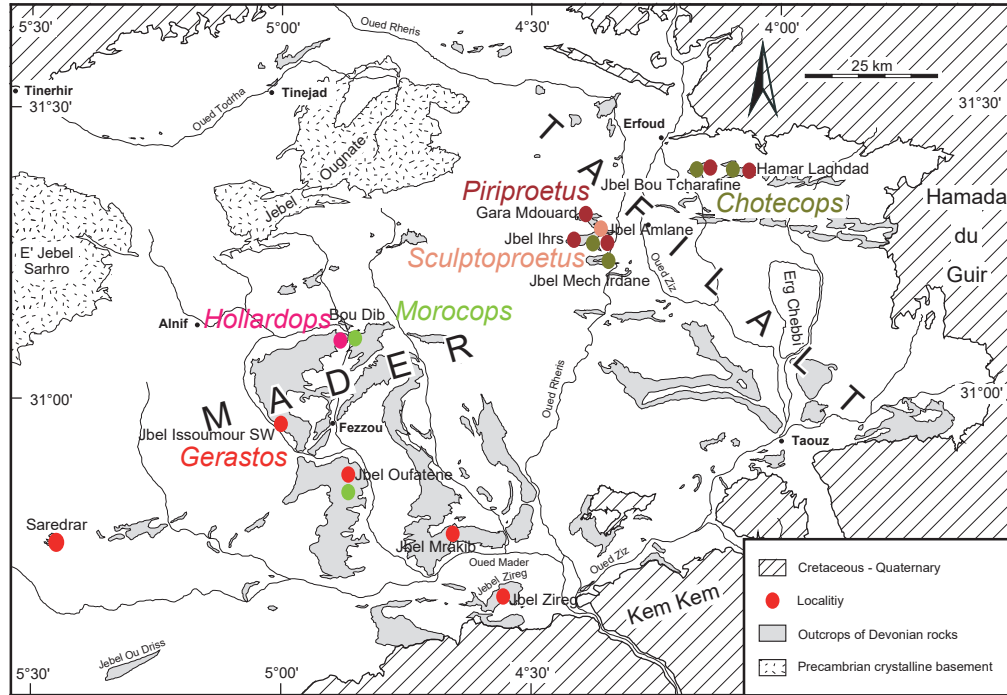
Pragian



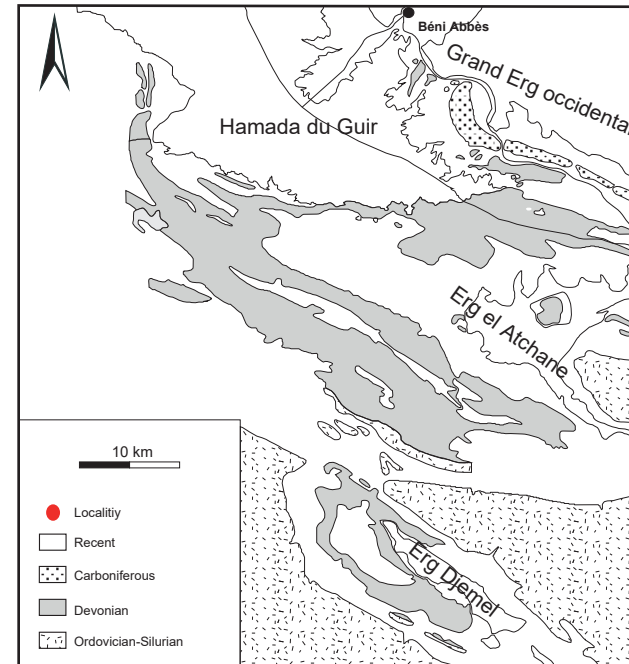
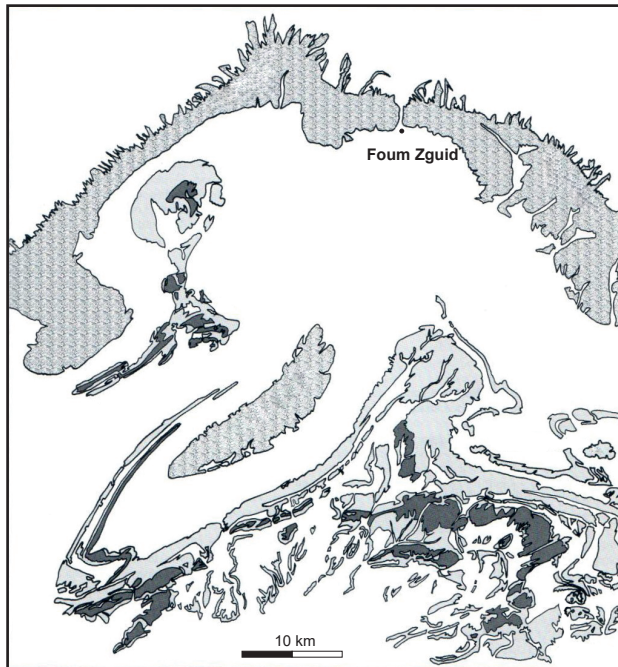
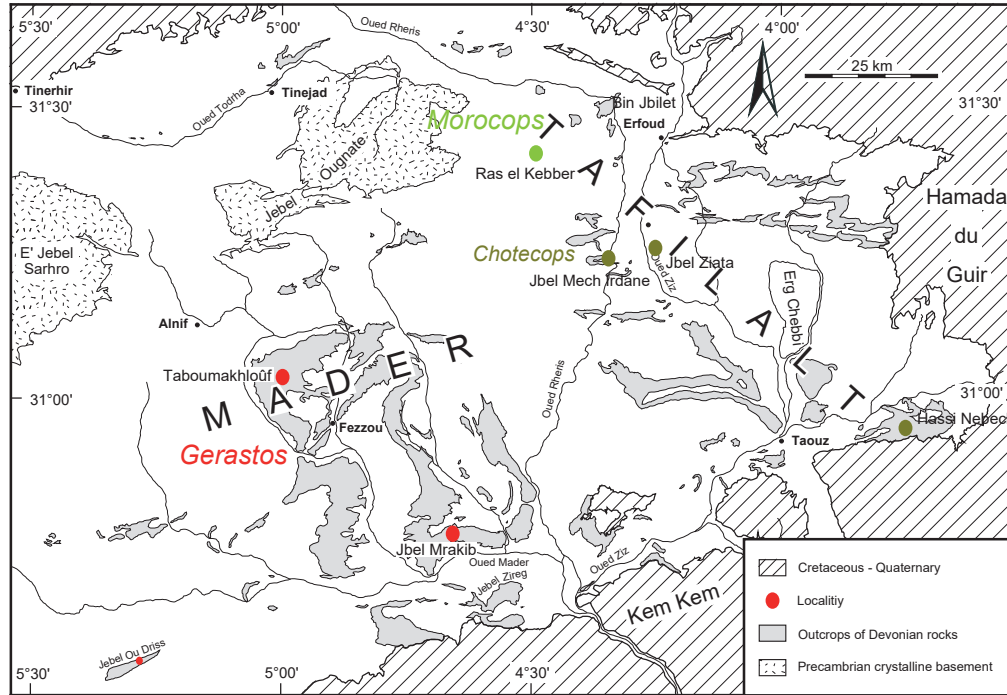
Emsian



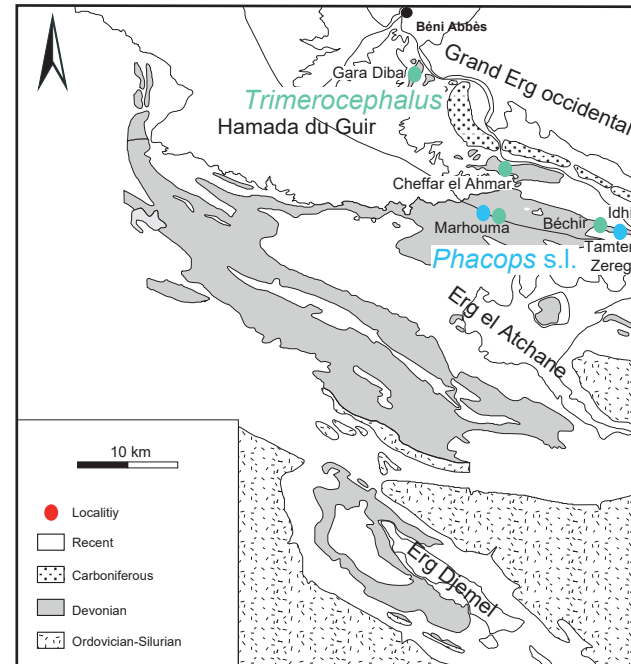
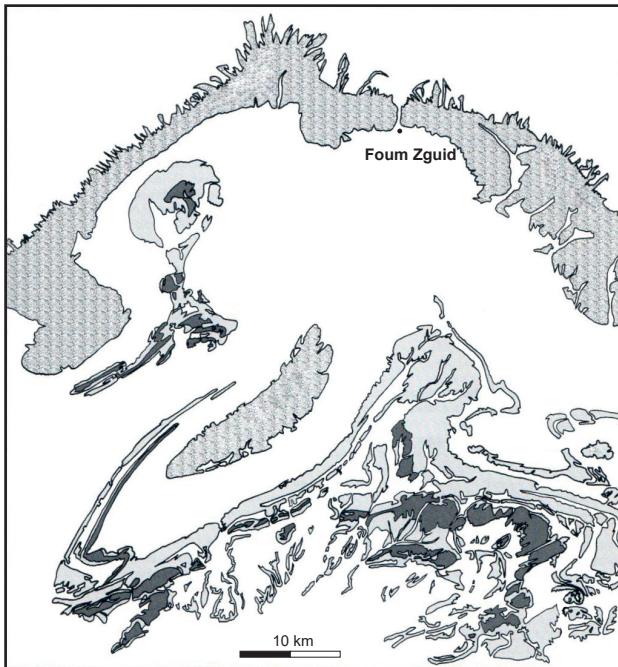
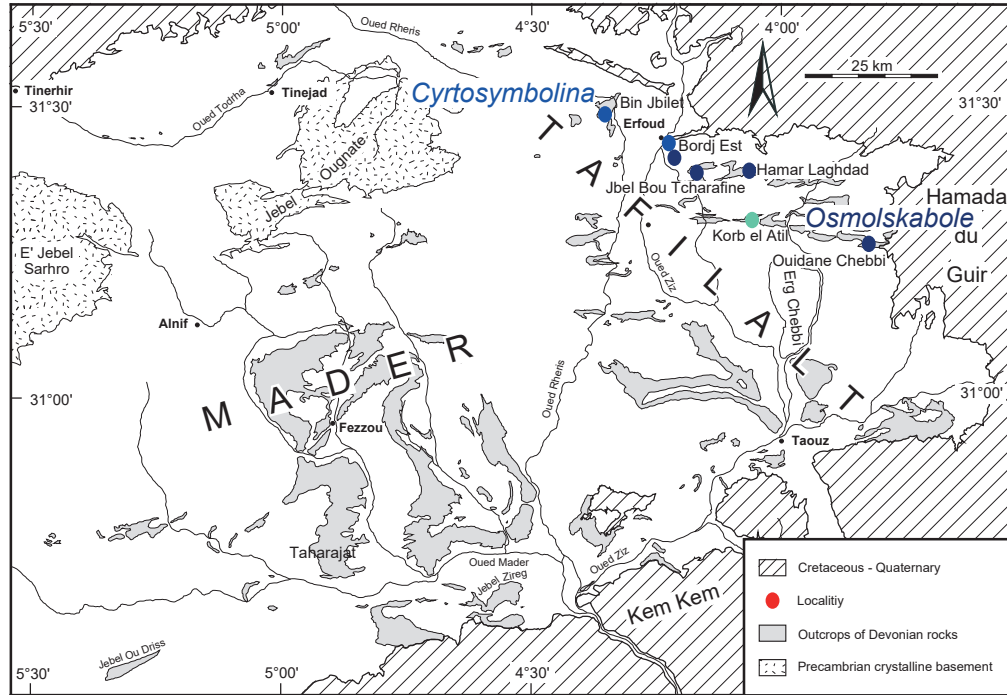
Eifelian



Givetian



Famennian



Associations	Samples	Geological time	Basins	Remarks
<i>Morzadecops</i> Association (<i>Ia</i>)	JO-Ema12/MEK-Ema03/ F12-Ema21/OC-Ema21	early Emsian	Dra Valley, Maïder and Tafilalt	<ul style="list-style-type: none"> • Only OC-Ema21 is diverse with six distinct genera recorded.
<i>Ganetops</i> Association (<i>Ib</i>)	Dkh-Lb31/EK-Lb31 /ED-Lb31/Zer-Lb31	late Lochkovian	<i>Ougarta</i>	<ul style="list-style-type: none"> • Zer-Lb31 added to the <i>Ganetops</i> Association based on the presence of both <i>Ganetops</i> and <i>Protacanthina</i> and DCA result • Dominated by two asteropygine genera (<i>Ganetops</i> and <i>Protacanthina</i>) • High overall β diversity.
<i>Montanproetus</i> Association (<i>Ic</i>)	BZ-Emb41/JA-Ema21/JBT-Ema21/JISW- Emb14	Emsian	Maïder, Tafilalt and Ben Zireg	<ul style="list-style-type: none"> • In limestone deposits
<i>Sculptoproetus</i> Association (<i>Id</i>)	JA-Eia21/EAt-Emb24/Ris-Emb24/Tim-P11/ EAt-Ema21/JISW-Ema12	Pragian to Eifelian	Tafilalt and Maïder	<ul style="list-style-type: none"> • Low overall β diversity • In shales or calcareous-shale alternations
<i>Piriproetus</i> Association (<i>Ie</i>)	GM-Eia24/GM-Emb24/GM-Eia25/JI- Eia25/JA-Eia25/JA-Emb24/HL-Eia25/JBT- Eia25/HL-Emb23/HL-Ema23	late Emsian to early Eifelian	Tafilalt	<ul style="list-style-type: none"> • In marly limestones deposits
<i>Hollardops</i> Association (<i>Iia</i>)	Tim-Emb15/BD-Eia16/BD-Emb15/FZ-Emb- 02/EK-Emb33/Zer-Emb33/JeA-Emb02/BD- Emb14/Zgu-Eia02/Zer-Ema32/Mar-Emb33	late Emsian to early Eifelian	the entire Anti- Atlas	<ul style="list-style-type: none"> • In limestones interbedded with shales from a relatively deep platform. • Association dominated by <i>Hollardops</i> and <i>Timsaloproetus</i> but they occurred together only in sample Zgu-Eia02
<i>Morocops</i> Association (<i>Iib</i>)	HL-Emb24/BD-Eia16/FZ-Eia02/BD-Emb15 /Tal-Emb15/JISW-Emb15/TO-Emb15/ED- Eia33/JO-Eia16/ED-Emb33/JGEZ- Emb02/JGEZ-Eia02/Mah-P11/Khr- Emb02/TT-Emb/Tis-Emb02/JO-Emb15/JO- Emb16/Tal-Emb24	Pragian, late Emsian to early Eifelian	Tafilalt, Maïder, Ougarta and Dra Valley	<ul style="list-style-type: none"> • Five other samples were added according to their taxonomic composition and from DCA results: TT-Emb, Tis-Emb02, JO-Emb15, JO-Emb16 and Tal-Emb25 • <i>Morocops</i>, <i>Cyphaspis</i> and <i>Austerops</i> represent the most widespread genera • Most diverse association of the whole Devonian
<i>Gerastos</i> Association (<i>Iic</i>)	JZg-Eia17/JeM-Ga18/ Tab-Gb18/JeM- Eia16/JZg-Eia16/Sar-Eia16/JeM-Eia17/JeM- Eib17/JO-Eib17/Tab-Ga18/JOD-Ga17/JISW- Eia16/JISW-Emb16	lower Eifelian to middle Givetian	Maïder Basin	<ul style="list-style-type: none"> • Association dominated by <i>Gerastos</i>, which is invariably present in all samples • In limestones
<i>Chotecops</i> Association (<i>Iid</i>)	HN-Gc26/Oua-Eia33/JMI-Ga25/JMI- Eib25/JZa-Ga25/JBT-Eib25/Mar-Eia33	Middle Devonian	Tafilalt and Ougarta	<ul style="list-style-type: none"> • Association dominated by three genera: <i>Chotecops</i>, <i>Struveaspis</i> and <i>Helmutia</i> • In marly limestones of pelagic environments
<i>Paralejurus</i> Association (<i>Iie</i>)	BZ-P41/MeK-P01/JOJI-P11/F12-P21/HL- P22/JO-P11/Tab-P11/Tis-P01/EAt-P21/BZ- Ema41	Pragian , early Emsian	Maïder, Tafilalt, Ben Zireg and Dra Valley	<ul style="list-style-type: none"> • Sample BZ-Ema41 was removed from the <i>Psychopyge</i> association to be placed in the <i>Paralejurus</i> Association based on the presence of <i>Prodrevermannia</i> and DCA results • High overall β diversity

<i>Psychopyge</i> Association (<i>IIf</i>)	JBT-Emb24/JO-Emb12/EIH-Emb02/BD-Emb13/Mar-Ema32	Emsian	Maider, Tafilalt and Ougarta basins	<ul style="list-style-type: none"> • Low overall β diversity • In interbedded marl and limestones
<i>Lepidoproetus</i> Association (<i>IIIa</i>)	AnT-P11/JeM-P11/JZg-P11/OJ-P11/JINW-P11/EAc-P11/Ams-P21/Lan-Emb02	Pragian, late Emsian	Tafilalt, Dra Valley	<ul style="list-style-type: none"> • Although <i>Lepidoproetus</i> was the most abundant genus, there is no dominant genus. • Low overall β diversity
<i>Cyrtosymbolina</i> Association (<i>IVa</i>)	BE-Fa26/BJ-Fa26	early Famennian	Tafilalt Platform	<ul style="list-style-type: none"> • Low overall β diversity
<i>Osmolskaboie</i> Association (<i>IVb</i>)	BE-Fb26/ BE-Fc26/HL-Fb26/JBT-Fb26/OC-Fb26/ BE-Fd26	middle Famennian to latest Famennian	Tafilalt Platform	<ul style="list-style-type: none"> • Most diverse association of the Late Devonian • In limestone only
<i>Trimerocephalus</i> Association (<i>IVc</i>)	KeA-Fb26/ Mar-Fa34/CeA-Fb34/GD-Fb34/Mar-Fb34/Bec-Fc34	early to middle Famennian	Ougarta Basin, Tafilalt	<ul style="list-style-type: none"> • Low overall β diversity • Relatively deep environment
<i>Phacops s.l.</i> Association (<i>IVd</i>)	TZ-Fb34/Idh-Fc34/TZ-Fc34/Mar-Fc34	middle Famennian to late Famennian	Ougarta Basin	<ul style="list-style-type: none"> • Poorly diverse