http://app.pan.pl/SOM/app68-Allaire_etal_SOM.pdf

SUPPLEMENTARY ONLINE MATERIAL FOR

Morphological disparity of early ammonoids: A geometric morphometric approach to investigate conch geometry

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Supplementary Online Material

SOM 1. Linear measurements used to compute the conch morphometry ratios.

SOM 2. Image files of the 582 analysed whorl profiles;
available at http://app.pan.pl/SOM/app68-Allaire_etal_SOM/SOM_2.zip

SOM 3. Excel file corresponding to the dataset used to perform the analysis of the whorl profiles; available at http://app.pan.pl/SOM/app68-Allaire_etal_SOM/SOM_3.csv

SOM 4. Excel file corresponding to the dataset used to perform the analysis of the conch morphometry ratios; available at http://app.pan.pl/SOM/app68-Allaire_etal_SOM/SOM_4.csv

SOM 5. Crossplots showing the distribution of the whorl profiles along the first and the second axes of the PCA.

SOM 6. Evolution of the morphospace occupation through the nine ammonoid zones constituting the Emsian of Morocco.

SOM 7. Evolution of the morphospace occupation through the 10 ammonoid zones constituting the Eifelian of Morocco.

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SOM 9. Tables showing the results of the Pearson's correlation tests.

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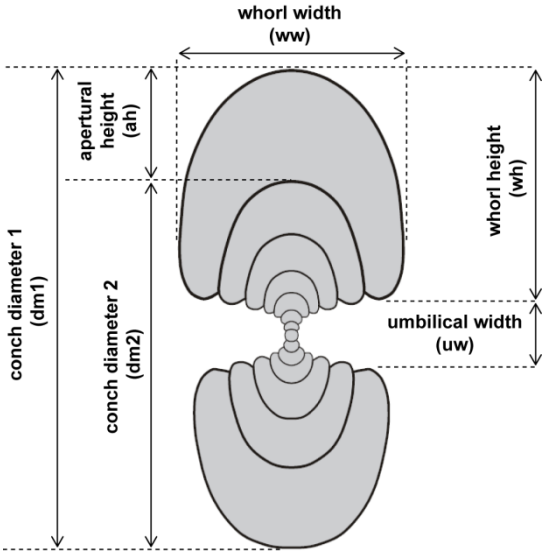
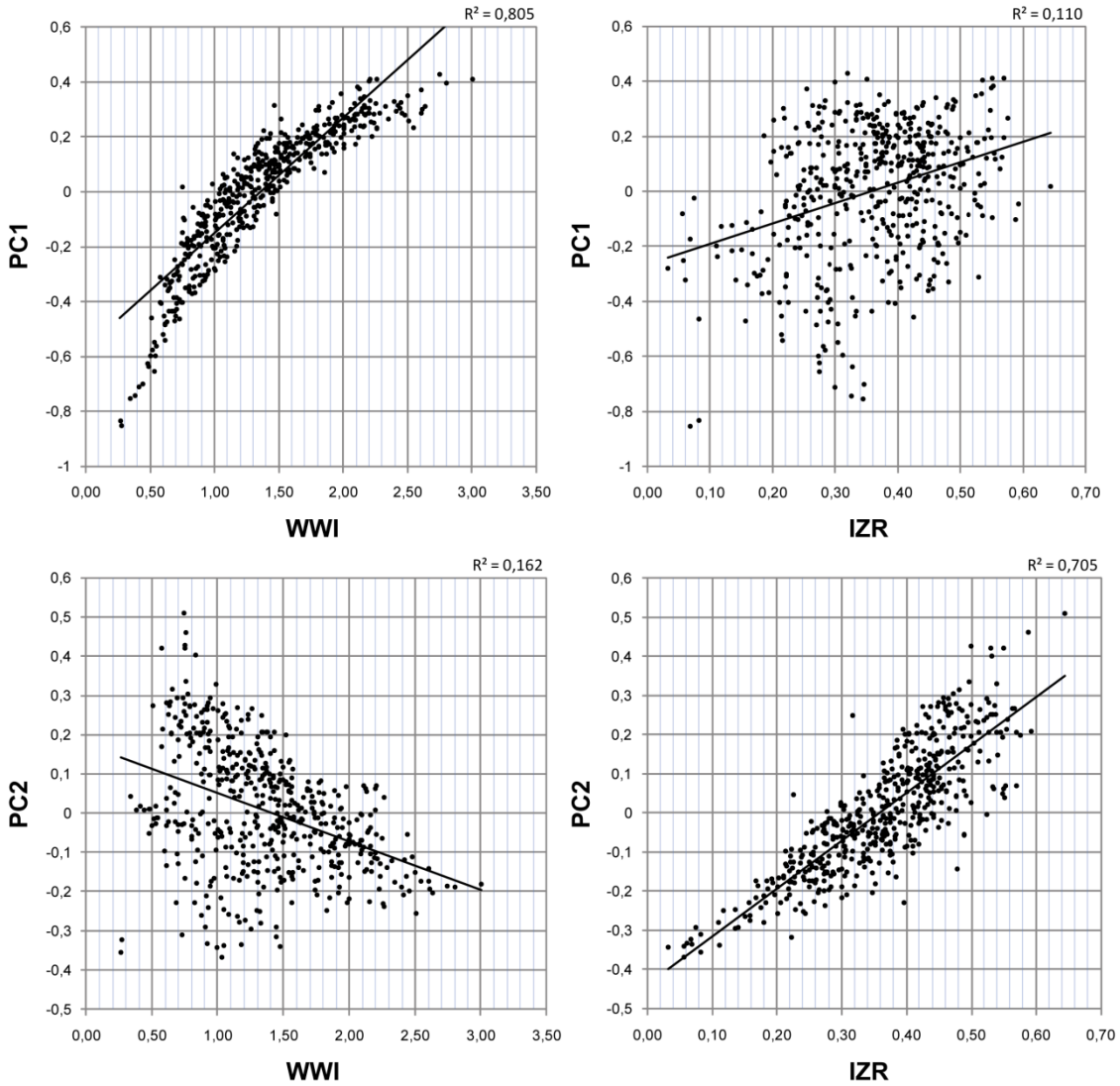
SOM 11. Evolution of disparity through the Early and Middle Devonian, based on theanalysis of the conch morphometry ratios.

SOM 12. Variations of the convex hull area computed for PC1 and PC2, based on the analysis of the conch morphometry ratios through the Early and Middle Devonian.

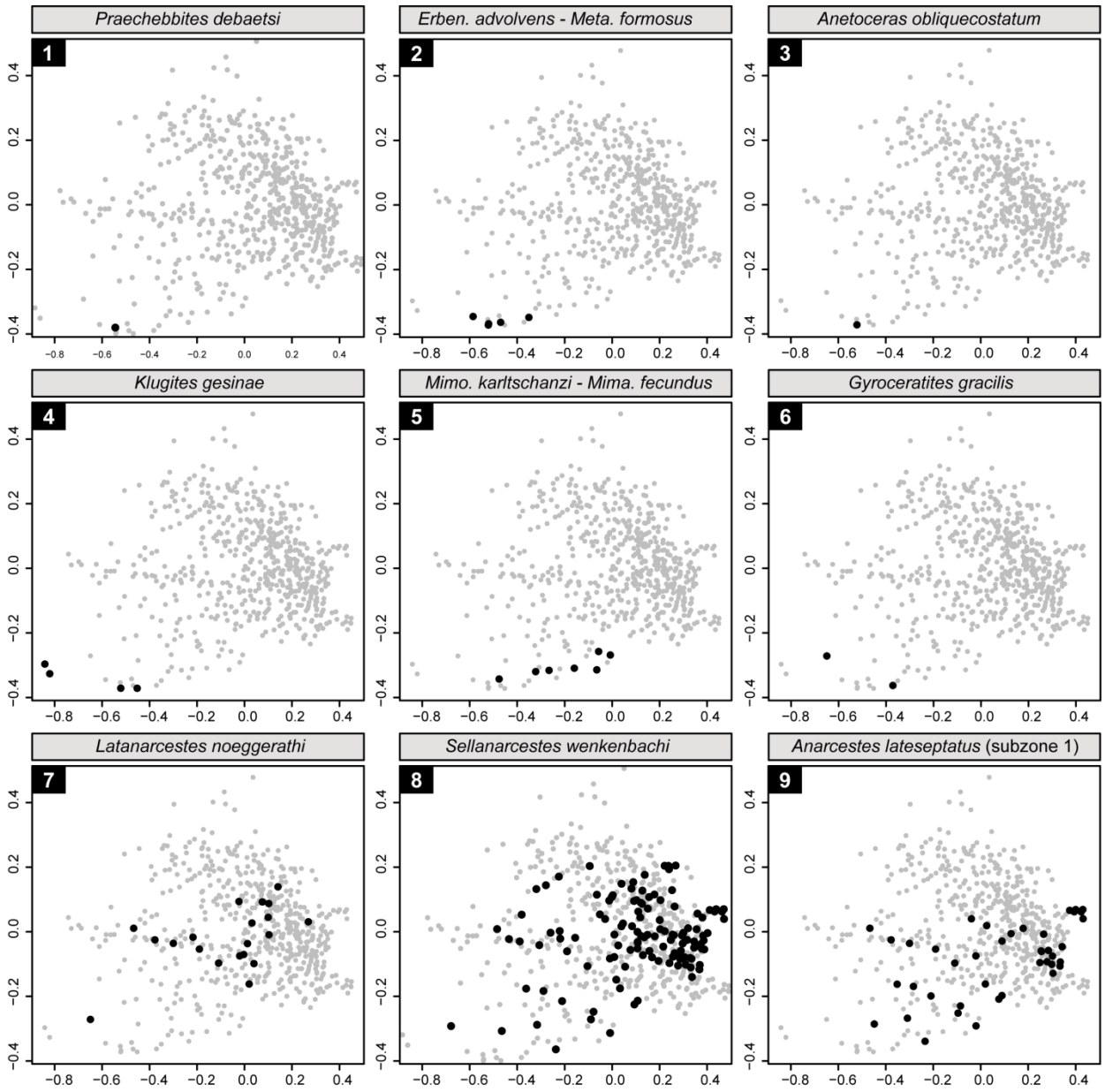
SOM 1. Linear measurements used to compute the conch morphometry ratios: Conch Width Index (CWI = ww/dm1), Umbilical Width Index (UWI = uw/dm1), Whorl Expansion Rate (WER = $(dm1/dm2)^2$), Whorl Width Index (WWI = ww/wh) and Imprint Zone Rate (IZR = (wh-ah)/wh).



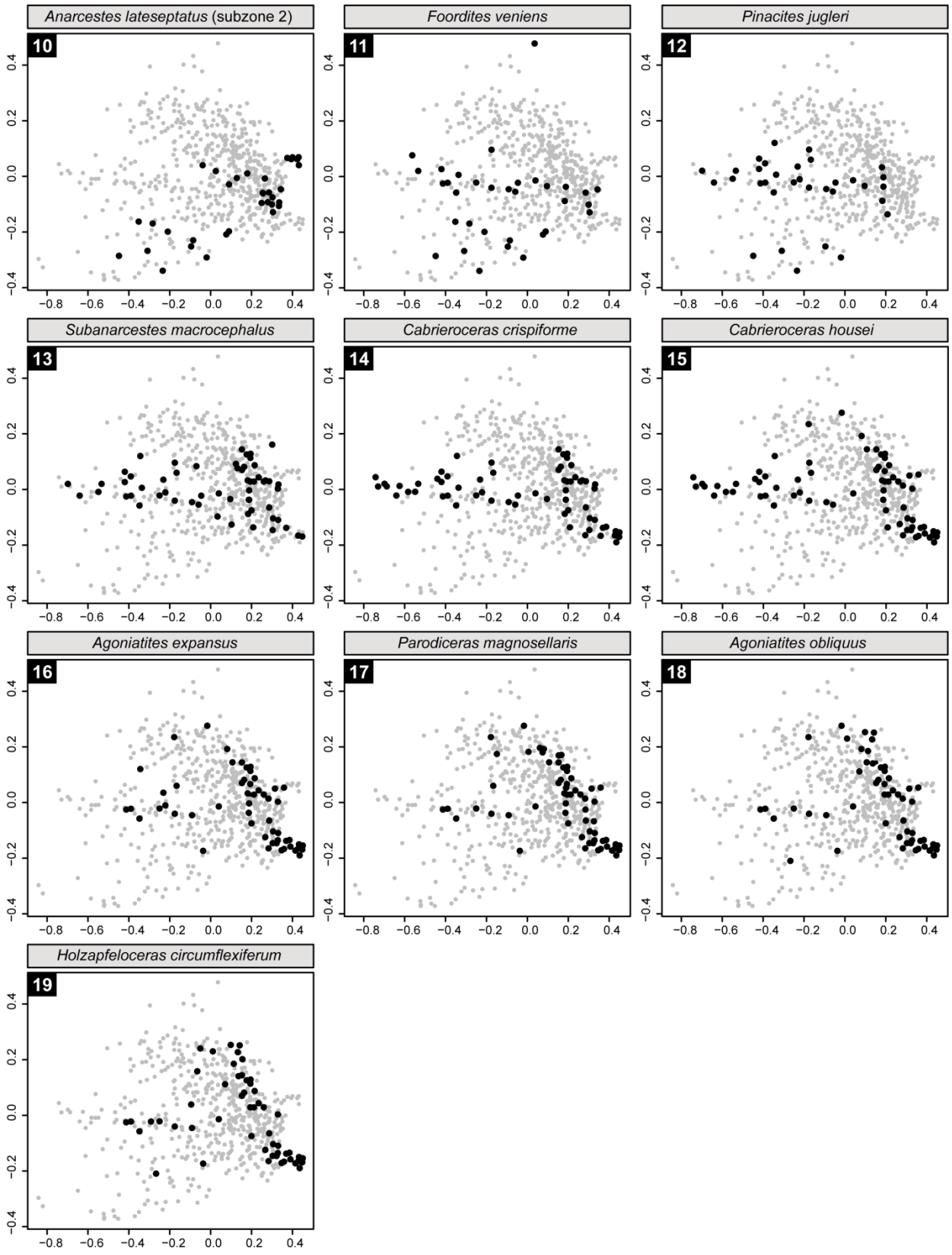
SOM 5. Crossplots showing the distribution of the whorl profiles along the first (PC1) and the second axes (PC2) of the PCA, depending of the imprint zone rate (IZR) and the whorl wide index (WWI).



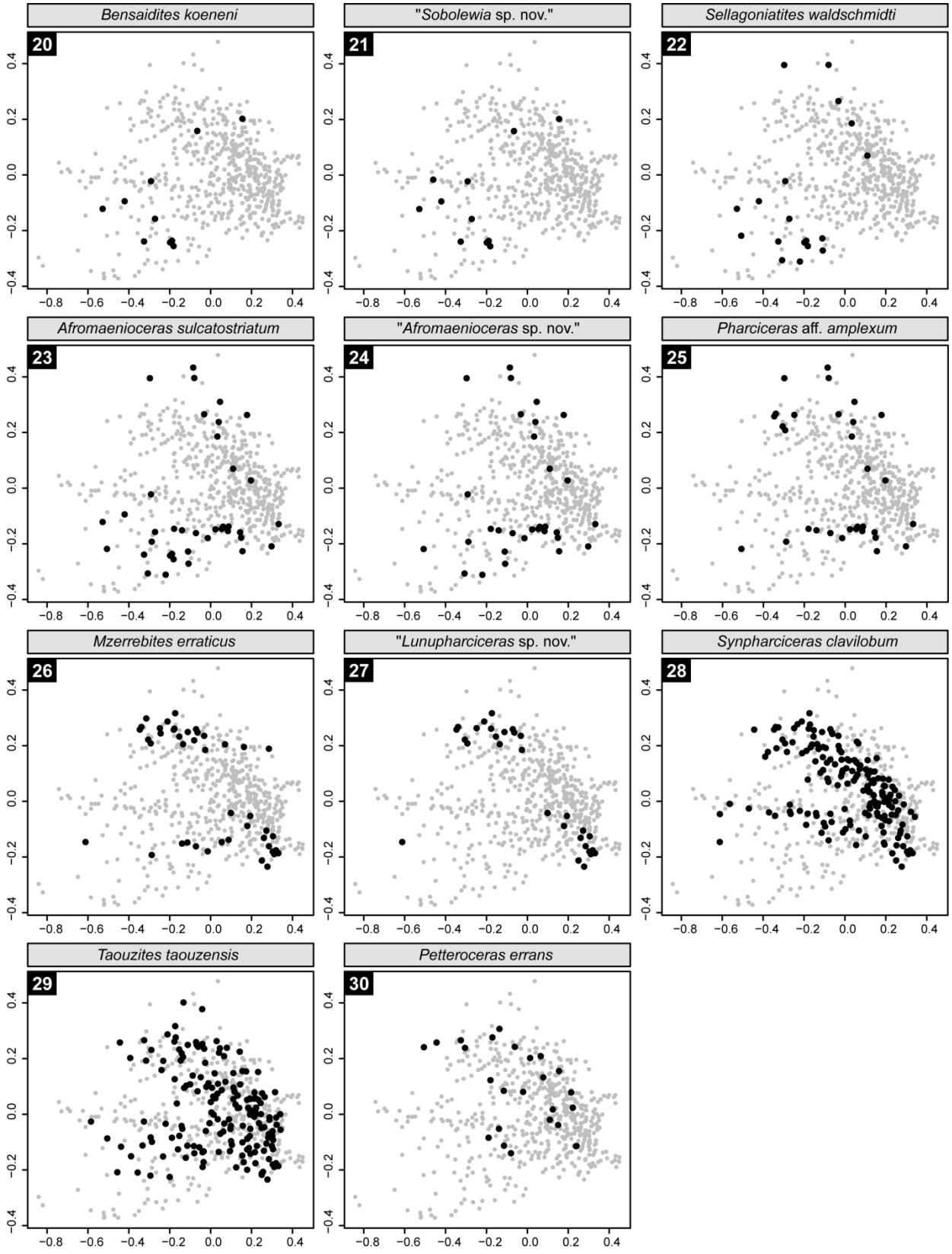
SOM 6. Evolution of the morphospace occupation through the nine ammonoid zones constituting the Emsian of Morocco; based on the analysis of the whorl profiles (on each diagram, the horizontal axis corresponds to PC1 and the vertical axis to PC2).



SOM 7. Evolution of the morphospace occupation through the 10 ammonoid zones constituting the Eifelian of Morocco; based on the analysis of the whorl profiles (on each diagram, the horizontal axis corresponds to PC1 and the vertical axis to PC2).



SOM 8. Evolution of the morphospace occupation through the 11 ammonoid zones constituting the Givetian of Morocco; based on the analysis of the whorl profiles (on each diagram, the horizontal axis corresponds to PC1 and the vertical axis to PC2).



SOM 9. Tables showing the results of the Pearson's correlation tests.

Pearson's correlation test (Diversity vs. Disparities - whorl profiles - interval resolution)

Data	t	df	p-value	Cor	IC (95%) lo	IC (95%) up
Nsp vs. Sum of ranges	-0.037165	4	0.9721	-0.01857918	-0.8178094	0.8051218
Nsp vs. Convex hull area	0.72434	4	0.509	0.3405259	-0.6509229	0.9026366
Nsp vs. Sum of variances	0.55915	4	0.6059	0.2692514	-0.6939470	0.8869924
Nsp vs. Squared Eucli. dist.	0.49184	4	0.6486	0.2388054	-0.7104436	0.8798476
Nsp vs. Average displacement	-0.6722	4	0.5383	-0.3185888	-0.8979748	0.6648801

Pearson's correlation test (Diversity vs. Disparities - whorl profiles - biozone resolution)

Data	t	df	p-value	Cor	IC (95%) lo	IC (95%) up
Nsp vs. Sum of ranges	3.677	24	0.001186	0.6002916	0.2774545	0.8013178
Nsp vs. Convex hull area	2.9833	24	0.006457	0.5201088	0.1662505	0.7552951
Nsp vs. Sum of variances	-0.80411	24	0.4292	-0.1619704	-0.5168927	0.2404684
Nsp vs. Squared Eucli. dist.	-0.44506	24	0.6603	-0.09047415	-0.4616475	0.3076598
Nsp vs. Average displacement	-1.9114	24	0.06797	-0.3634746	-0.6581622	0.0277900

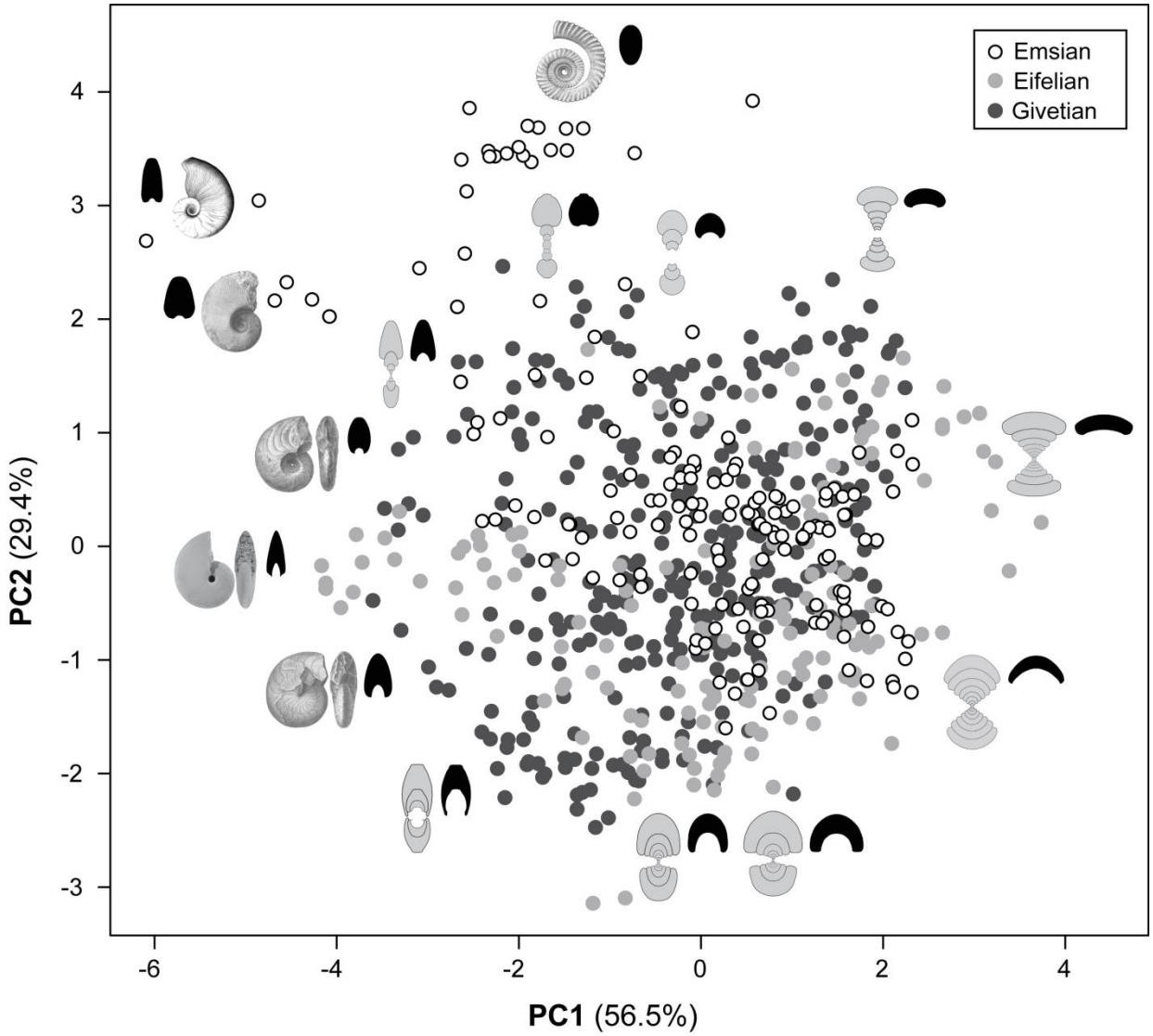
Pearson's correlation test (Diversity vs. Disparities - conch morphometry ratios - interval resolution)

Data	t	df	p-value	Cor	IC (95%) lo	IC (95%) up
Nsp vs. Sum of ranges	0.68486	4	0.5311	0.3239609	-0.6615245	0.8991286
Nsp vs. Convex hull area	0.44444	4	0.6797	0.2169292	-0.7216858	0.8745286
Nsp vs. Sum of variances	0.47701	4	0.6582	0.2319956	-0.7139958	0.8782089
Nsp vs. Squared Eucli. dist.	0.43844	4	0.6837	0.2141337	-0.7230877	0.8738372
Nsp vs. Average displacement	-0.6223	4	0.5675	-0.2970988	-0.8932783	0.6779179

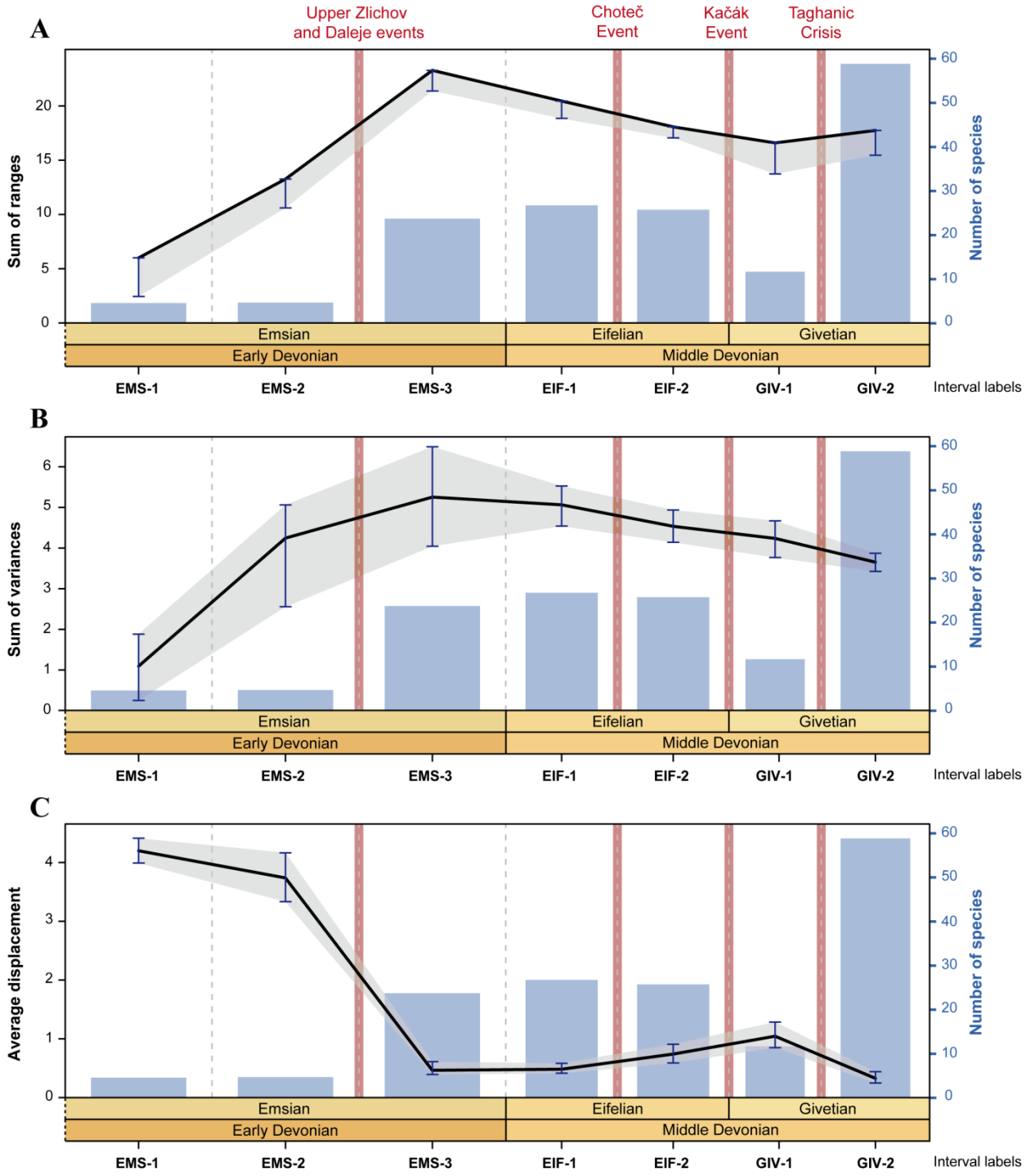
Pearson's correlation test (Diversity vs. Disparities - conch morphometry ratios - biozone resolution)

Data	t	df	p-value	Cor	IC (95%) lo	IC (95%) up
Nsp vs. Sum of ranges	3.2432	27	0.00314	0.5294812	0.2022174	0.7503714
Nsp vs. Convex hull area	4.0413	27	0.0003967	0.6139287	0.3192589	0.8003491
Nsp vs. Sum of variances	-1.0139	27	0.3196	-0.1915206	-0.5214257	0.1881951
Nsp vs. Squared Eucli. dist.	-0.92477	27	0.3633	-0.1752184	-0.5090346	0.2044145
Nsp vs. Average displacement	-1.9856	27	0.05732	-0.3569557	-0.63976348	0.01098745

SOM 10. Morphospace occupation observed for the Early and Middle Devonian, based on the analysis of the conch morphometry ratios (CWI, UWI, WER, WWI, IZR), with representative examples of shapes. The first two axes explain 85.9% of the variance.



SOM 11. Disparity and diversity fluctuations through the Early and Middle Devonian; based on the analysis of the conch morphometry ratios (CWI, UWI, WER, WWI, IZR). **A**. Sum of ranges (black line with grey area showing the confidence intervals) and sampled-in-bin diversity (blue bars). **B**. Sum of variances (black line with grey area showing the confidence intervals) and sampled-in-bin diversity (blue bars). **C**. Average displacement (black line with grey area showing the confidence intervals) and sampled-in-bin diversity (blue bars). Confidence intervals (error bars) are computed after 1000 bootstraps. See Fig. 2 in the main text for interval labels.



SOM 12. Variations of the convex hull area computed for PC 1 and PC2, based on the analysis of the conch morphometry ratios through the Early and Middle Devonian. Comparison of the measured values with the expected values given diversity, computed by applying the null model of Whalen et al. (2020).