



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

SUPPLEMENTARY ONLINE MATERIAL FOR

Parmalean and other siliceous nannofossils from the Oligocene Polish Flysch Carpathians

Irena Kaczmarska and James M. Ehrman

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Supplementary Online Material

SOM 1. Animated GIF file of experimental schematic of *Parmoligocena janusii* sp. nov. using measurements from the holotype specimen (cell, dorsal shield and ventral plate opening radii) on a presumed spherical cell. The angle of dorsal shield openings (lower right) was varied between 50° and 89° (with 0° placing the openings concentric at the dorsal pole of the cell) available at http://app.pan.pl/SOM/app68-Kaczmarska_Ehrman_SOM/SOM1.gif

SOM 2. OpenSCAD script for the generation of the model in the SOM 1 animation, including adjustable parameters for cell feature measurements and angle of dorsal shield openings.

SOM 3. Errors in OpenSCAD simulation measurements of separations between the ventral plate and dorsal shields and between dorsal shields compared to actual measurements from holotype.

SOM 4. Underlying data for graphs in Fig. 6.

SOM 2

```
/*[Hidden]*/
$fa=3;
$fs=0.1;

/*[Parameters]*/
//Outside radius of cell
osr=1.405; //[1:0.1:10.0]

//Wall thickness; used to calculate inside radius of cell
wt=0.25; //[0.1:0.01:1.0]

//Inside radius of cell
isr=osr-wt;

//Cylinder used to create openings by difference; height excessive to insure holes go through model
ch=wt*50;

//Dorsal shield angle; 90 = at equator
dsa=65; //[0:1:90]

//Ventral plate radius
vpr=1.075; //[0:0.1:10.0]

//Dorsal shield radius; can be modified individually with multipliers (s1 m, s2m, s3m) below; Value = 1 makes them
all the same
dsr=0.934; //[0:0.1:10.0]

s1 m=1.0; //[0.10:0.01:5.00]
s2m=1.0; //[0.10:0.01:5.00]
s3m=1.0; //[0.10:0.01:5.00]

difference() {
//Cell body
sphere(r=osr);
sphere(r=isr);

//Opening for ventral plate
translate([0,0,0])
rotate([0,180,0])
cylinder(h=ch,r=vpr,center=false);

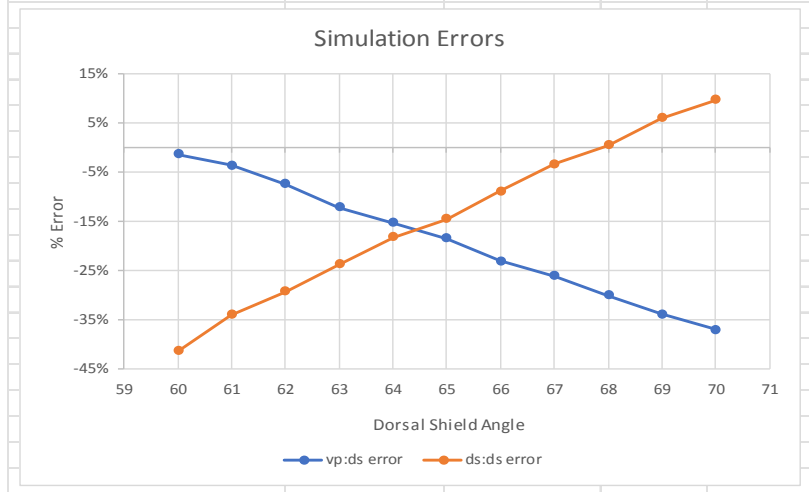
//Opening for dorsal shield 1
translate([0,0,0])
rotate([dsa,0,0])
cylinder(h=ch,r=dsr*s1 m,center=false);

//Opening for dorsal shield 2
translate([0,0,0])
rotate([dsa,0,120])
cylinder(h=ch,r=dsr*s2m,center=false);

//Opening for dorsal shield 3
translate([0,0,0])
rotate([dsa,0,240])
cylinder(h=ch,r=dsr*s3m,center=false);
}
```

SOM 3

Measurements from holotype cell (μm):					
cell diameter		2.810			
ventral plate (vp) diameter		2.150			
dorsal shields (ds) diameter		1.868			
vp:ds separation		0.674			
ds:ds separation		0.563			
Errors in OpenSCAD simulation measurements compared to holotype:					
Angle	vp:ds separation	ds:ds separation	vp:ds error	ds:ds error	
60	0.664	0.330	-1.4%	-41.4%	
61	0.649	0.371	-3.6%	-34.1%	
62	0.623	0.398	-7.5%	-29.3%	
63	0.591	0.429	-12.2%	-23.8%	
64	0.570	0.460	-15.4%	-18.3%	
65	0.549	0.481	-18.5%	-14.6%	
66	0.518	0.513	-23.1%	-8.9%	
67	0.497	0.544	-26.2%	-3.4%	
68	0.471	0.565	-30.1%	0.4%	
69	0.445	0.596	-33.9%	5.9%	
70	0.424	0.617	-37.0%	9.6%	



SOM 4

Fig. 6A:

Cell #	Ventral Plate Diameter	Shield Diameter	Cell Diameter
1	2.150	1.869	2.809
2	2.576	1.993	3.375
3	2.345	1.511	3.290
4	2.436	1.972	3.153
5	2.469	1.796	3.563
6	2.269	2.002	2.797
7	2.521	2.226	3.235
8	2.457	2.388	3.454
9	2.256	1.827	3.331
10	2.364	2.002	3.191
11	2.767	2.320	3.068
12	2.406	2.014	3.245
13	2.410	1.917	3.095
14	2.668	2.133	3.312
15	2.325	2.022	3.265

Fig. 6B:

Opening Diameters	Plate Diameters
1.316	1.307
1.459	1.603
1.463	1.645
1.496	1.670
1.542	1.739
1.666	1.749
1.723	1.757
1.733	1.768
1.752	1.809
1.776	1.828
1.807	1.845
1.827	1.898
1.861	1.901
1.913	1.908
1.928	1.910
1.941	1.961
1.959	1.962
1.990	1.969
1.994	1.992
2.000	2.000
2.040	2.016
2.092	2.042
2.126	2.059
2.192	2.076
2.356	2.077
2.362	2.092
2.393	2.092
2.404	2.104
2.420	2.124
2.546	2.159
2.705	2.182
	2.191
	2.191
	2.224
	2.243
	2.254
	2.274
	2.305
	2.333
	2.336
	2.401
	2.491