**Supplementary Figures**

Supplementary Figure 1. Asteropyginid specimens shown in tangent space of PC1 and PC2 resulting from the geometric morphometric analysis with shape and color combinations corresponding to species. B) Consensus configuration from the Procrustes analysis. Black dots depict positions of landmarks and semilandmarks, gray dots depict the variation in specimen landmark locations around the average. C) Deformation grids showing glabella shape at the extremes of PC1 and PC2.

Supplementary Figure 2. Asteropyginid specimens shown in tangent space of PC1 and PC3 resulting from the geometric morphometric analysis, with colors corresponding to genera. Deformation grids showing glabella shape at the extremes of PC1 and PC3.

Supplementary Figure 3. PCA of glabellar outlines described by elliptical Fourier coefficients color-coded by genus and changes in outline shape corresponding to PCs. A) PC1-PC2; B) mean outline shape; and C) thin-plate spline deformation grids associated with PC1 and PC2.

Supplementary Figure 4. PCA of glabellar outlines described by elliptical Fourier coefficients and changes in outline shape corresponding to PCs. A) PC1-PC3; B) mean outline shape; and C) thin-plate spline deformation grids associated with PC1 and PC3.

Supplementary Figure 5. PCA of landmark data from the geometric morphometric analysis. Specimens and convex hulls colored by time and convex hulls separated into four panels to better see their position in morphospace.

Supplementary Figure 6. PCA of outline data from the elliptical Fourier analysis. Specimens and convex hulls colored by time and convex hulls separated into four panels to better see their position in morphospace.

**Supplementary Table**

Supplementary Table 1. Trilobite species considered, along with a list giving the published image that was used in this study, the associated publication, museum ID, stratigraphic data, whether it was an image of a type specimen, and locality.