**Supporting Information**

**geobiological and diagenetic insights FROM A MALVINOKAFFRIC Devonian BIOTA (Chapada Group, Paraná Basin, Brazil): paleobiological and paleoenvironmental implications**

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*RRH: DEVONIAN INVERTEBRATES OF PARANÁ BASIN*

*LLH: B. BECKER-KERBER ET AL.*

**Table. S1**. Classes of preservation of the invertebrate fossils analyzed in this study.

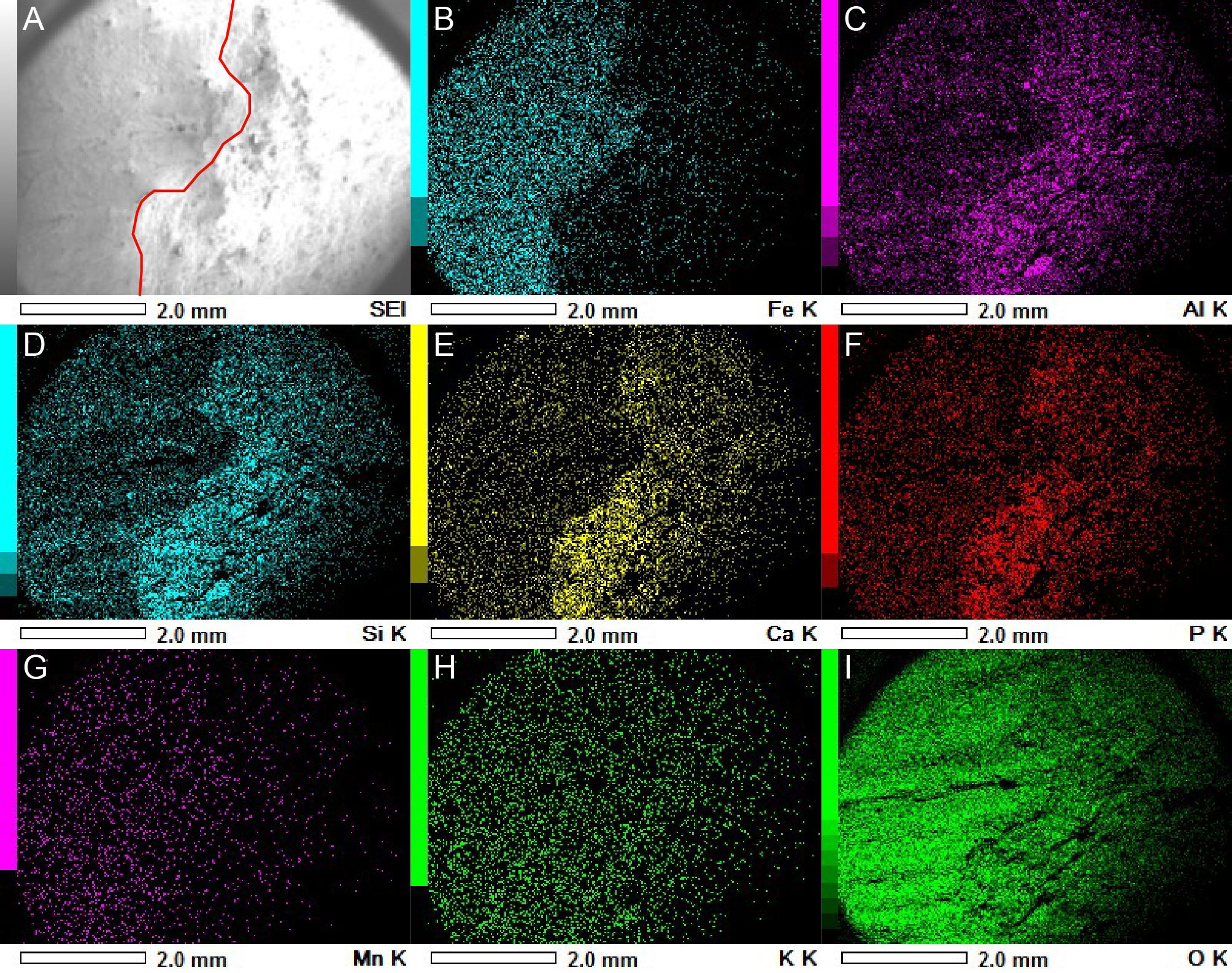
|  |  |  |  |
| --- | --- | --- | --- |
| **Classes of preservation** | **Linguliformean brachiopods** | **Rhynchonelliformean brachiopods** | **Trilobites** |
| *Preserved shell* | 45 | 0 | 1 |
| *Molds with coatings* | 0 | 57 | 8 |
| *Molds* | 0 | 4 | 0 |

**Table. S2**. Collection numbers and localities of the samples considered in geochemical analyses.

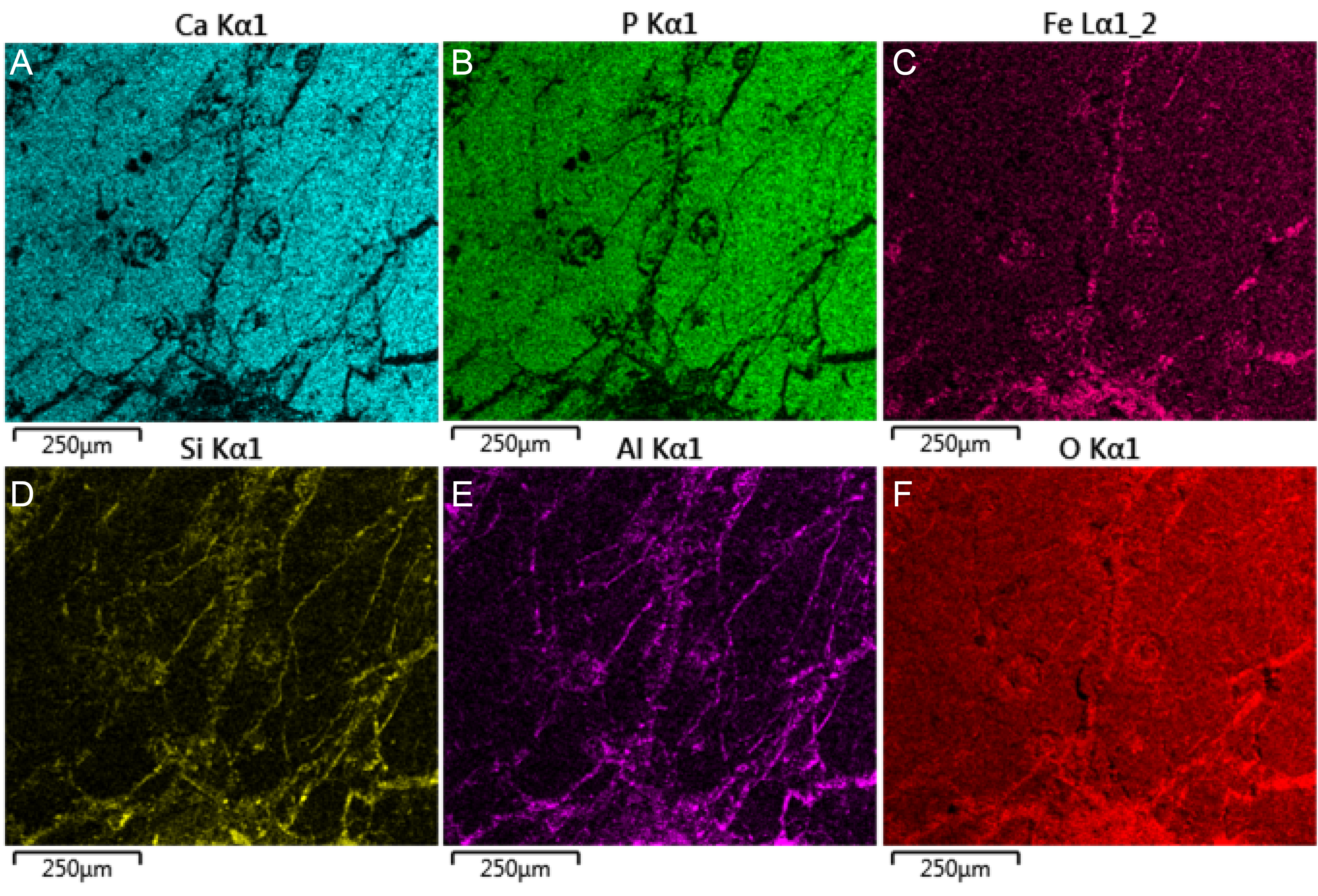
|  |  |  |  |
| --- | --- | --- | --- |
| **Fossil** | **Collection Number** | **Geographic coordinates** | |
| *Orbiculoidea* 1 | CCLP1121 | 18°55'10" S - 54°48'53" W |
| *Orbiculoidea* 2 | CCLP1122 | 18°55'10" S - 54°48'53" W |
| *Orbiculoidea* 3 | CCLP1123 | 18°56'19" S - 54°50'12" W |
| *Orbiculoidea* 4 | CCLP1124 | 18°55'10" S - 54°48'53" W |
| *Orbiculoidea* 5 | CCLP1125 | 18°55'10" S - 54°48'53" W |
| *Orbiculoidea* 6 | CCLP1126 | 18°55'10" S - 54°48'53" W |
| Rhynchonellata 1 | CCLP1127 | 18°55'10" S - 54°48'53" W |
| Rhynchonellata 2 | CCLP1128 | 18°55'10" S - 54°48'53" W |
| Strophomenata 1 | CCLP1129 | 18°55'10" S - 54°48'53" W |
| Strophomenata 2 | CCLP1130 | 18°56'19" S - 54°50'12" W |
| Strophomenata 3 | CCLP1131 | 18°55'10" S - 54°48'53" W |
| Rhynchonelliformean brachiopod fragment | CCLP1132 | 18°55'10" S - 54°48'53" W |
| Calmoniid trilobite | CCLP1118 | 18°55'10" S - 54°48'53" W |
| Calmoniid trilobite within concretion | CCLP1119 | 18°56'19" S - 54°50'12" W |

**Table. S3**. List of specimens from Malvinokaffric fauna found in Devonian outcrops (Alto Garças Sub-basin, Paraná Basin) and analyzed in this study.

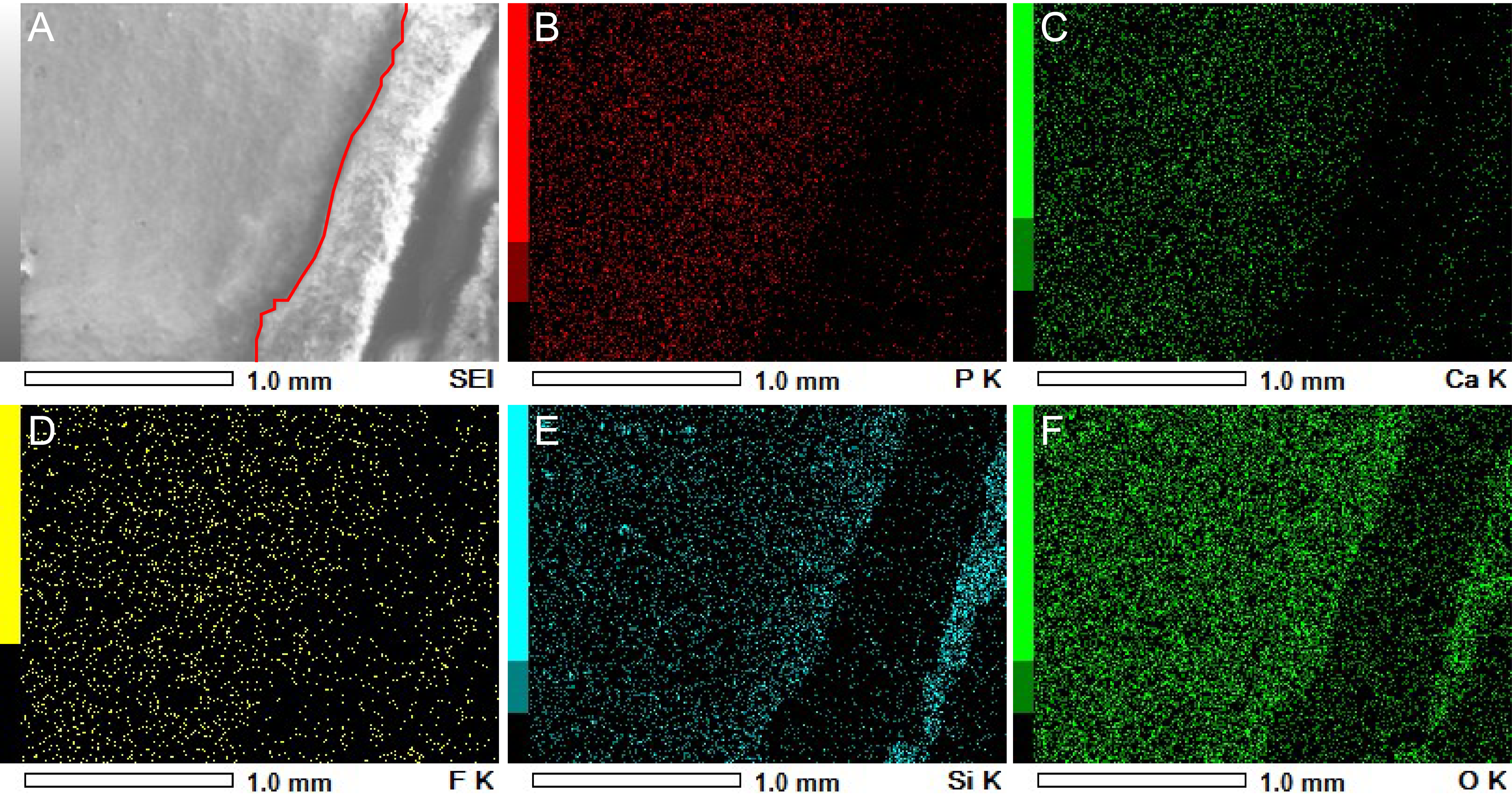
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Phyllum** | **Class** | **Family** | **Genus** | **Species** |
| Brachiopoda | Rhynchonellata | Hysterolitidae | *Australospirifer* | *Australospirifer* sp. |
|  | Leptocoeliidae | *Australocoelia* | *Australocoelia palmata* |
| Strophomenata | Schuchertellidae | *Schuchertella* | *Schuchertella* sp. |
|  | Strophochonetidae | strophochonetids | strophochonetids |
|  | Chonetidae | chonetids | chonetids |
| Lingulata | Discinidae | *Orbiculoidea* | *Orbiculoidea* cf. *baini* |
|  |  |  | *Orbiculoidea* cf. *bondenbenderi* |
|  |  |  | *Orbiculoidea* cf. *excentrica* |
|  |  | *Gigadiscina* | *Gigadiscina* sp. |
|  |  | *Rugadiscina* | *Rugadiscina* sp. |
|  | Lingulidae | lingulids | lingulids |
| Arthropoda | Trilobita | Calmoniidae | *Calmonia* | *Calmonia* sp. |
|  | *Metacrypheus* sp. | *Metacrypheus* sp. |



**Fig. S1.** EDS mapping of strophomenate brachiopod in phosphate concretion. **A)** Original figure with the interface between the fossil (left of the red line) and the host rock. **B)** Map of iron. **C)** Map of aluminum. **D)** Map of silicon. **E)** Map of calcium. **F)** Map of phosphorus. **G)** Map of manganese. **H)** Map of potassium. **I)** Map of oxygen.



**Fig. S2.** EDS mapping of a calmoniid trilobite. **A)** Map of calcium showing higher intensities in the substituted exoskeleton. **B)** Map of phosphorus. **C)** Map of iron. **D)** Map of silicon. **E)** Map of aluminum. **F)** Map of oxygen.



**Fig. S3.** EDS mapping of the lateral edge of a concretion hosting an orbiculoid. **A)** Original image with the interface between the edge of the concretion (left) and the edge of the thin section (right). **B)** Map of phosphorus. **C)** Map of calcium. **D)** Map of fluor. **E)** Map of silicon. **F)** Map of oxygen.