PALYNOLOGY AND PALYNOCHEMISTRY ANALYSIS OF THE LLANDOVERY-WENLOCK
LA CHILCA FORMATION, ARGENTINA

Introduction

The Silurian deposits of the Argentinean Central Province are
represented in the Tucuncú Group, composed of the
La Chilca and the Los Espigay formations. The La Chilca
Formation was extensively studied in the last fifty years;
however fossil records were sparse, and mainly constrained
to the lower and middle part of the stratigraphic unit. A
transgressive high sea-level is interpreted by the faunal
records (including planktonic foraminifera and bryozoans). The
La Chilca Formation continued to be slightly transgressive
resulting in a condensed section of the Tucuncú Group
between the Los Espigay and La Chilca Formations.

The sample analyzed in this study comes from the
Tucuncú Group, and it was collected in the middle part of
the stratigraphic section. The sample was prepared and
described by the Brazilian Geologist, Dr. Ana Paula de Almeida
Gonçalves. The sample was collected in the middle part of
the stratigraphic section, and it consists of a mixture of
organic material, primarily consisting of plant remains and
pollen. The sample was analyzed using a combination of
electrical and optical microscopy to identify the different
plant remains and pollen types present in the sample.

The results show a high diversity of plant remains and
pollen types, indicating a complex vegetation cover in the
area during the Silurian. The sample contains a variety of
deciduous and evergreen tree pollen, as well as
broadleaf and coniferous pollen. The presence of
pollen types characteristic of temperate and tropical
climates indicates a warm and humid environment.

Results and Discussion

Twenty-three samples were collected from the
Quebrada Ancha section and analyzed. The results
show a high diversity of plant remains and pollen types,
indicating a complex vegetation cover in the area during
the Silurian. The sample contains a variety of deciduous
and evergreen tree pollen, as well as broadleaf and
coniferous pollen. The presence of pollen types characteristic
of temperate and tropical climates indicates a warm and
humid environment. The results also support the
hypothesis of a pronounced climatic event during the
Silurian, which is reflected in the vegetation pattern.

The palynofacies analysis is performed through a
clastic diagram that allows the differentiation of two main
assemblages: A and B. Palynofacies association A is
characterized by the highest content of terrestrial and
aquatic plant remains, while Palynofacies association B
is characterized by the highest content of aquatic plant
remains. The association A includes a higher diversity
of plant remains, indicating a more complex vegetation
cover in the area. The association B includes a higher
diversity of aquatic plant remains, indicating a
transient aquatic environment.

The TOC (Total Organic Matter) values display three main
peaks. The lowest one occurs in the lower part of
the section, in the laminated pelite, probably deposited in
anoxic conditions causing high preservation of
organic matter while the remaining two peaks are in the middle to upper part of the section. The
latter could be interpreted as sea level rise episodes that have probably produced anoxic conditions,
allowing better preservation of the organic matter and pointing to a fluctuating shallowwater system.

The AOM (Amorphous Organic Matter) is probably derived from the degraded phytoplankton. This would
explain why the percentage of AOM increases while the percentage of palynomorph remains decreases, and
vice versa. The palynofacies analysis allows the recognition of minor environmental changes in the section such as
possible flooding and anoxic events, also suggesting the response of phytoplankton to those changes.

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