

# CONSIDERATIONS ABOUT THE "SULPHUR ANOMALY" IN THE PEAT SEDIMENTS FROM IRAÍ (RIO GRANDE DO SUL, BRAZIL) VERIFIED BY ORGANIC GEOCHEMISTRY ANALYSIS

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**ABSTRACT:** There are some mineral water springs in the city of Iraí, and also some sediments with a dark aspect popularly known as “medicinal mud”. This last one is extracted from a well (it was opened for business purposes), located in a wetland area next to the city. In that location, the region is often water saturated because of the Uruguay River. People utilize “mud” and mineral water for baths in spas of Iraí for therapeutic purposes. This attitude constitutes a complementary source of income for the city. This study aims to characterize the organic geochemistry of the peat sediments obtained through “Iraí T3-core” (115 cm) proximally dated in 10.586 years before present – BP. The total organic carbon (TOC) changes too much from the bottom to the top of the core (values between 2.80% and 27.10%). The total sulfur (TS) also changes substantially. It reaches the minimum value of 0.06% and the maximum of 5.10%. In general, the total amount of TOC and TS can be considered very high in the basal samples mainly (115-85 cm). It could be related with an anoxic and stagnant environment that favored the organic matter (OM) preservation. It is resulted from a high primary productivity. The geochemical organic analysis revealed that the sample of 99 cm deep (8.908 years BP) is very peculiar. TS levels (4.70%) are bigger than TOC levels (3.10%) in that core section. The high concentration of TS could be related to sulfur-reduction process of the organic matter in the sediment. However, the low concentration of TOC in this layer does not match with this hypothesis. Thus, the anomalous high level of TS in comparison to TOC suggests that the contamination came from another place in the environment. The causes of the anomalous values are not very well explained, but it could be related to thermal springs containing mineral waters with high chloride and sulfate content in the region, or with a volcanism event occurred in the Andean Region between 8.000-9.000 years BP. However, there is no evidence of tephra in the sedimentary records of equivalent ages in southern Brazil that supports the volcanism hypothesis as being an external source subsidizing the high sulfur content of the sediment. Therefore, the thermal-springs hypothesis in the region seems to be very reasonable, because according some authors, the hydrogeochemical characteristics of the mineral waters suggest that other aquifers deeper than the Guarani System can be connected hydraulically with the “fractured” aquifer of the Serra Geral Formation through large faults or fractures, resulting in a mixed water with very peculiar characteristics. Therefore, the additional sources of sulfur could be derived from these deeper aquifers, although such studies are still incomplete. However, it is evident that some factor not yet identified has restricted the accumulation of sulfur mainly to the 99 cm level.

**KEY WORD:** VOLCANISM. THERMAL-SPRINGS. AQUIFERS.