Geological Report: Origin and Formation of Crystal Rocks in the Itambé Region, Bahia

1. Introduction

The region around Itambé (southwestern Bahia, Brazil) is home to numerous rock formations with crystalline structure and striking coloration, indicative of a complex geological history. The area lies within the ancient São Francisco Craton and is part of the Itabuna-Salvador-Curaçá Belt, a geologically significant structural zone.

2. Observations

The field photographs show rocks with the following features:
- Color: reddish, orange to light beige with some white inclusions
- Texture: coarse-grained, sometimes crystalline
- Surface: weathered, some freshly broken
- Distribution: lying on the surface or slightly embedded in the soil, sometimes clustered

These features strongly suggest quartz-bearing rocks such as quartzite, hydrothermally altered quartz, or pegmatitic granite outcrops containing quartz crystals, feldspars, and possibly mica.

3. Geological Formation

3.1. Metamorphism and Tectonics

The rocks in the Itambé region are mostly of Precambrian origin (older than 540 million years). The region experienced long-term tectonic processes that buried older sedimentary and igneous rocks, which were then metamorphosed under high pressure and temperature. Quartzites result from the recrystallization of sandstone. Tectonic uplift and erosion brought these rocks to the surface.

3.2. Hydrothermal Processes

In many areas, hot silica-rich fluids penetrated the rock through fractures. This led to the formation of quartz veins, often accompanied by iron oxides (responsible for reddish coloration) and other minerals such as feldspar or mica.

4. Transport and Positioning

The visible rocks are mostly in-situ, meaning they were not transported by water or glaciers but are remnants of weathered bedrock. The brownish crust on some stones indicates slow chemical weathering under tropical climate (lateritization). Larger boulders may have been manually uncovered or moved due to agricultural activity.

5. Conclusion

The crystal rocks in Itambé are the result of a long geological process involving metamorphism, hydrothermal activity, tectonic uplift, and tropical weathering. They are witnesses to an ancient geological history spanning hundreds of millions of years. Their occurrence is typical of the 'Alto Sertão Baiano' region, which is also known for a variety of quartz, pegmatites, and even gemstones like tourmaline and topaz in nearby areas such as Vitória da Conquista and Brumado.

6. Additional Notes

- Geological map and literature: See CPRM (Geological Survey of Brazil), Itambé / Vitória da Conquista map series.
- Reference: Almeida et al. (2000), 'Geologia do Brasil', Editora Oficina de Textos.
- Recommendation: A targeted petrographic analysis (e.g. thin section microscopy or XRF) would allow for more precise identification.

7. Image Documentation

Figure 1: Large crystal rock with orange surface near a fence post.

Figure 2: Landscape overview with exposed boulders.

Figure 3: Cluster of quartz-rich stones with visible textures.

Figure 4: Isolated weathered quartz block with smooth surface.

Figure 5: Reddish quartz rock among smaller fragments.

Figure 6: Quartz rock embedded in slightly sunken terrain.