

## Summary

### Geologic Survey of Kapoeta County

#### **Introduction**

South Sudan is one of the least geologically investigated areas of the world. Apart from a few exploration activities, very little effort has been exerted to understand the geology of the region. The Geology Working Group, one of the six Strategic Analysis and Capacity Building Working Groups, undertook a six-week reconnaissance survey in Kapoeta County in April 2002 to develop a general overview of the geology of the area. The team also updated topographic maps from the 1930s and 1940s which were the only maps available for the region.

#### **Results of the Fieldwork**

##### ***Regional Geology***

The study area has a geology similar to that found in northern Kenya and western Ethiopia. It is representative the western limit of the volcanic terrain that extends from Ethiopia and continues southwards to northern Kenya.

##### ***Geomorphology***

The study area can be divided into three geomorphologic units:

- a) Mountains: The Didinga Hills and Mogila Mountains are between 1400m and 2700m above sea level.
- b) Dykes and plugs: These features consist of hills that rise sharply from the plains. Heights vary between 800m and 1000m.
- c) Plains: Areas below 700m.

##### ***Hydrology***

The hydrology of the area is dominated by seasonal streams and rivers, which generally flow from the southwest to the northeast. The catchment area for the water is the Didinga Hills in the west, where the Nakodok, Narus and Loyoro rivers originate. These rivers discharge into the swampy area northeast of Narus. During the rainy season, these rivers are flooded. The flow of water, however, stops shortly after the rains have stopped leaving behind the wet riverbed and some small water ponds.

##### ***Petrology (Rocks of the Area)***

The rocks of the study area are predominantly of volcanic origin. Basaltic rocks constitute most of the hills. Alluvial sediments also cover parts of the area and are mainly found in the southern part of the area. The basaltic rocks found on the hills and at Loyoro River are very hard and dense.

##### ***Tectonic and Volcanism***

A major lava flow – probably submarine – seems to have covered the whole area. The subsequent intrusions, however, came to surface through apparently deep-seated fractures

as can be witnessed by the ridge-like shapes of some of some hills in the area. Most of the hills are actually volcanic dykes that stretch north to south or east to west with dykes exposed at the ridge or centers of these hills. Two major faults trending north–south were observed at Lotupwamurio (10 km north of Narus) and Lopua (9 km west of Narus), respectively.

### ***Minerals Found During the Survey***

#### ***1. Quartz and Chalcedony***

A relatively high population of quartz and chalcedony was encountered north of Narus town. The different forms of chalcedony and many of the crystalline varieties of quartz are used as gemstones and other ornamental materials. Pure rock crystal is used in optical and electronic equipment.

#### ***2. Agate***

This is a rock or mineral composed of layers of quartz, sometimes of different colors. The composition of agate varies greatly, but silica is always predominant. Agate can be polished and is often used for ornamental purposes.

#### ***3. Petrified Wood***

Petrified wood is a wood that was completely transformed into a stone but maintained its original cell structure. Petrified wood, though of little industrial importance, is of archaeological significance when found in large quantities, e.g., the Petrified Forest National Park in Arizona.

#### ***4. Gold***

According to the information from local people, gold is found in three main areas, namely Napotpot and Naita in Kapoeta County and near Boma town. Gold is reported to be extracted from hard rocks or panned from alluvial deposits in riverbeds. According to the information from the local people, the gold in the area near Kapoeta is panned from alluvial sediments. The yield varies depending on the season. Rainy seasons are said to have higher yields (up to 5gm/day).

#### ***5. Other Minerals***

Some samples brought from the neighboring Budi and Torit counties were presented to the geology team. These were identified as pyrite and ilmenite/magnetite. Ilmenite ( $\text{FeTiO}_3$ ) and magnetite ( $\text{Fe}_2\text{O}_3$ ) are the main sources of titanium and iron, respectively.

### **Conclusions and Recommendations**

The fieldwork has been a success. It has been an eye-opener for the local population and authorities, who were unaware about the presence of minerals other than gold. The experience of this team shows that there are more minerals in the areas of the New Sudan than have been reported up to now. The occurrence of ilmenite/hematite and the gold-bearing pyrite, for example, have never been documented before.