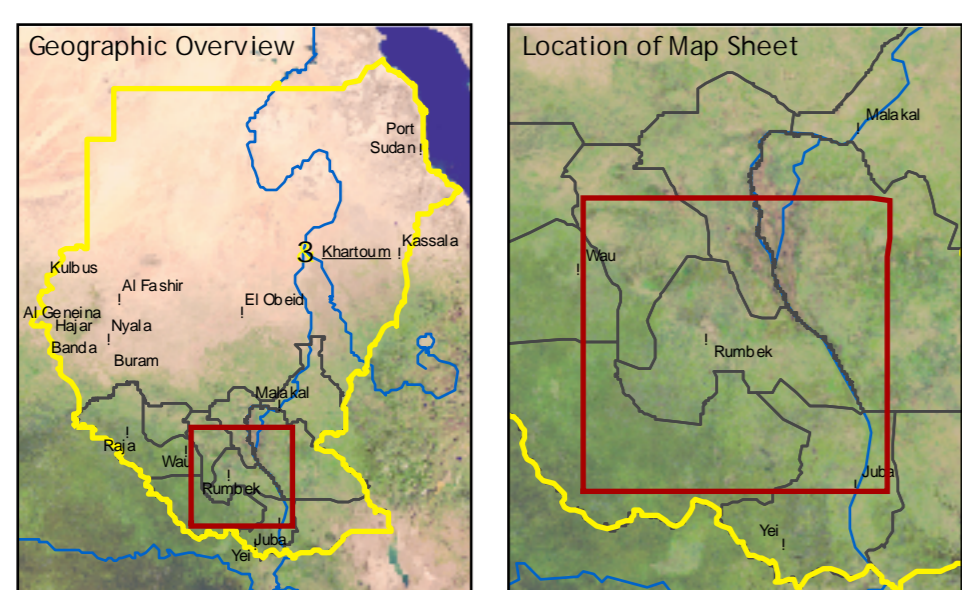


Southern Sudan State Map Series

Lakes State

Sudan
1 : 500'000

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3003 Berne, Switzerland

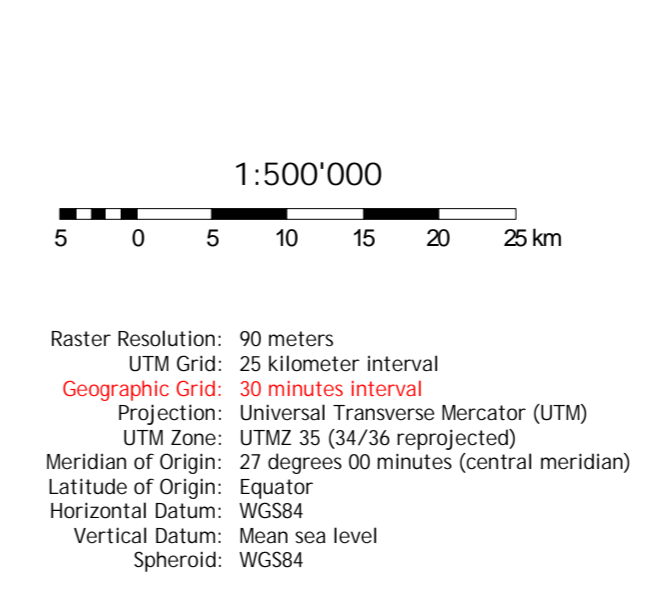


- Political boundaries**
- State boundary (tentative)
 - National boundary
 - North-South demarcation line 1956 (tentative)
- Settlements**
- State capital
 - Principal town
 - Secondary town
 - Administrative town
 - Settlement (verified)
 - Settlement (not verified)
 - Built-up area
- Topography**
- Spot height
 - Main contour (100m interval)
 - Inter-mediate contour (40m interval)
 - Supplementary contour
- Geographical features**
- Hills and mountains

- Infrastructural features**
- Airstrip (CIE)
 - Main road (CDE)
 - Gravel road (CDE)
 - Dirt road (CDE)
 - Street (CDE)
 - Railway (CDE) (non-operational)
 - Bridge (EIS)
 - Main road (ES)
 - Gravel road (ES)
 - Street (EIS)
 - Dirt road and track (EIS)
- Hydrological features**
- Canal (unfinkished)
 - Pipeline
 - Main river
 - Seasonal river
 - Occasional river
 - Episodic river
 - Dry river
 - Canal
 - Lake and riverbed

- Elevation classes**
- below 400 m
 - 401 - 450 m
 - 451 - 500 m
 - 501 - 550 m
 - 551 - 700 m
 - 701 - 900 m
 - 901 - 1300 m
 - 1301 - 1700 m
 - 1701 - 2500 m
 - above 2500 m

- Land cover classes**
- Forest
 - Rubland
 - Sparse vegetation
 - Arable land
 - Surface water
 - Wetlands
 - Freshwater marshes and floodplains
 - Rain brackish and saline wetland



Project information

The present map sheet is composed of field maps (1:250,000) and is one of the maps of the Southern Sudan State Map Series (1:500,000). The maps and the geodatabase were prepared by the Centre for Development and Environment (CDE) of the University of Berne, Switzerland, with funding from the Swiss Federal Department of Foreign Affairs. The maps to be published are a technical contribution to support the humanitarian, peace-keeping and reconstruction efforts in Southern Sudan. Boundaries, infrastructure, settlement locations and the North-South demarcation line of 1956 shown on this map are not authoritative and should not be considered as such. The CDE (University of Berne) would not be liable for any information that could improve this map. For comments and suggestions, please contact the CDE at info@cdet.uzh.ch.

Data sources

Most of the line and point features were provided by Esri/GeoInformation International, Minneapolis, USA (ESRI based on the Russian Military Topographic Map, 1:200,000 and 1:100,000 Series). Many recent objects (mainly infrastructure, such as roads, pipelines, air strips, as well as rectified villages, water surfaces and meanders) were added, based on satellite image interpretation by CDE.

32/2717 Landsat ETM+ data of NASA's GeoCover Program (2000). Further sources: Intersected, CDE data on ESRI server, UNLCC, UNICEF, UNHCR, FAO AHCover project, Global Name and Gazetteer server, CIA/NO Global Wetland Data, NOAA North-South and individual communications among the international aid community.

Delta compilation

Georeferencing of spatial data was obtained through vector-to-image rectification. Except for the non-sloping area, NASA's SRTM+ data were used as a reference for topographic features and for the development of a digital terrain model (DTM). The DTM has a 90-meter resolution and shows contours, artificial built and shaded relief. In flat areas the DTM was calculated based on spot heights and contours from map sources. Ground truthing and control points were not applied. Average geometric distortion is estimated to be below 1/7, 150 m. Wetland, forest, both and shrub cover were derived from Landsat ETM+, Terra MO-250 (VCI and EVI), and FAO AHCover data (agriculture). Information was classified and cross-validated. Verification on terrain was not applied. Better modelling, geodata compilation and digital cartography were done with CDE ArcGIS 9.1 and Locus ERDAS IMAGINE 8.1.

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