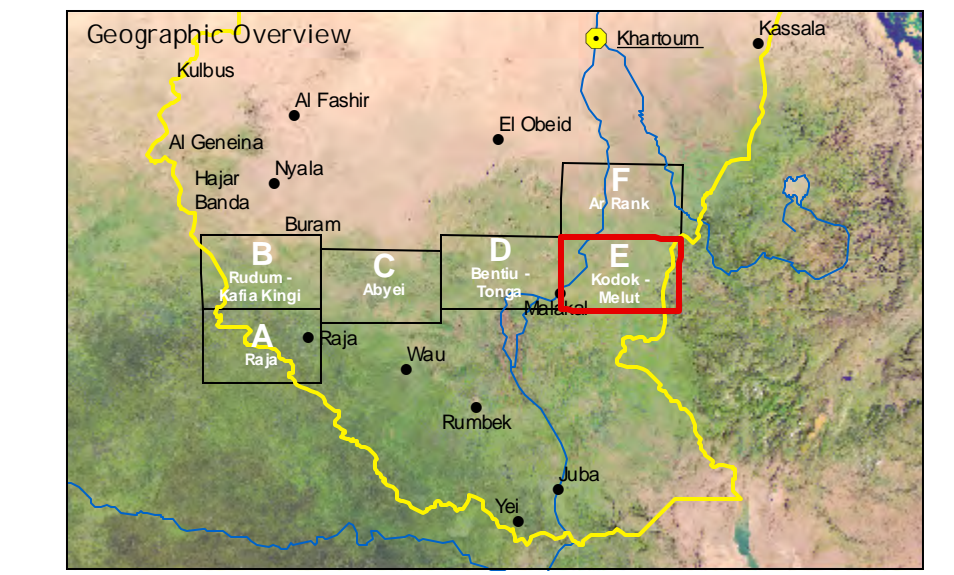


SUDAN

Topographic Field Map
North/South Border Map Series

Map sheet: Kodok - Melut

Upper - / Blue Nile



1:250'000

Scale bar: 0 5 10 15 20 km
Raster Resolution: 90 meters
UTM Grid: 25 Kilometer interval
Coordinate: 10 kilometers interval
Projection: Universal Transverse Mercator (UTM)
UTM Zone: UTM 32
Meridian of Origin: 27 degrees 00 minutes E of Greenwich
Latitude of Origin: Equator
Horizontal Datum: WGS84
Vertical Datum: Mean sea level
Spheroid: WGS84

Copyright ©
CDE centre for development and environment
University of Bern
Bühlstrasse 4
3008 Bern, Switzerland
Version: Bern, Revision 1, March 2008
Author: www.cde.unibe.ch

- Settlements**
 - State capital
 - Principal town
 - Secondary town
 - Administrative town
 - Settlement (with info)
 - Settlement (not with info)
 - Built-up area
 - Vulnerable area (1000-500)
 - School
 - Infrastructural features
 - Main road (CDE)
 - Gravel / dirt road (CDE)
 - Track (CDE)
 - Street (CDE)
 - Railway (CDE)
 - Main road (ES)
 - Gravel road (ES)
 - Street (ES)
 - Dirt road or track (ES)
 - Bridge
 - River crossing
- Political boundaries**
 - National boundary
 - Tribal area
 - Dinka / Nuer/tribal area
 - Hydrological features
 - Main river
 - Seasonal river
 - Occasional river
 - Episodic river
 - Dry river or dry
 - Canal (unfished)
 - Pipeline
 - Boothole (non-operational)
 - Culvert
 - Fund / Post
 - Reservoir
 - Spring
 - Well
 - Wetland
- Topography**
 - Spot height
 - Main contour (100 m interval)
 - Intermediate contour (50 m interval)
 - Supplementary contour (25 m interval)
 - Land cover classes
 - Sparse vegetation (single shrubs, grasslands)
 - Shrubby vegetation (scrubland)
 - Dense vegetation (forests, mature crops)
 - (Fringed, rainfall)
 - Settlement area (built-up area)
 - Quaternary (basement, volcanic)
 - Wetlands (marshes, swamps)
 - Surface Water (perennial waterbodies)
- Elevation classes**
 - below 400 m
 - 401 - 450 m
 - 451 - 500 m
 - 501 - 550 m
 - 551 - 600 m
 - 601 - 650 m
 - 651 - 700 m
 - 701 - 750 m
 - 751 - 800 m
 - 801 - 1,300 m
 - 1,301 - 1,800 m
 - 1,801 - 2,500 m
 - above 2,500 m

Disclaimer:
The boundaries, denominations and any other information shown on this map do not imply any judgement about the legal status of any territory, or constitute any official endorsement or acceptance of the boundaries on the part of any Government. The publisher (CDE) assumes no liability for any direct, incidental, special, or consequential damages whatsoever. The publisher (CDE) is not responsible for claims by any third party.

Project Information
The present map was prepared for the **North-South Border Commission**, whose work is in progress as part of the implementation of the Comprehensive Peace Agreement signed on January 9, 2005. The map sheet is part of a series of maps 1:250,000 and 1:100,000 covering the tentative border area of the northern and southern part of Sudan. The map and the geographical database were prepared by the Centre for Development and Environment (CDE) of the University of Bern, Switzerland.
Map authors: Hans Christoph, Xavier Jürg, Henning Christian, Gernot Ursula, Erika Maria Emanuel, Geographisches Institut, Centre for Development and Environment, Institute of Geography, University of Bern.

Technical data sources
Image sources: Most of the line and point features (mainly roads, tracks, pipelines, air strips, as well as resettled villages, water surfaces and meanders) were added, based on satellite image interpretation by CDE.
Satellite images used: Terra ASTER vnr data for 2002-2006, Landsat ETM+ 7/4/2 and Earthstar Natural View (ES) 3/2/1 data for 2000 and Digital Globe QuickBird 2 imagery for 2003-2005.
Internal data sources: Geodatabase of UNICEF, www.unicef.org; UNICEF, UNHCR, UNRWA, WFP, OLS data on DERIA server, FAO AfricaCover project, Global Name and Gazetteer data, Global Wetland Data (GWD), Coastal Earth File, NCRC North South and individual communications within the international aid community.
Map sources: Eastview Information Services (ES), Minneapolis, USA
www.eastview.com (mainly Russian Military Topographic Map, 1:200,000 and 1:100,000 Series)
Other sources consulted: in particular the Topographic Map Series 1:250,000 published by the Sudan Survey Department 1934-1937 (partly revised 1974).

Data compilation
Coordinating of spatial data was obtained through image-to-image and vector-to-image rectification. Except for the non-rectifiable areas, a Universal Transverse Mercator (UTM) datum were used as the principal reference for the topographic features and the environment of the digital terrain and the highly detailed drainage model. The DTM has a 90-meter resolution and shows contours (10m intervals), artificial built-up (10m intervals), slopes, aspect, spot heights and a shaded relief. In flat areas the DTM was calculated based on spot heights and contour from map sources. Ground control points were applied for image registration. Average geometric distortion is estimated to be below +/- 100 m. Wetlands, forest, built-up and other cover were derived from Landsat ETM+, Terra MODIS (NDF and EVI), and FAO AfricaCover data (agriculture). Information was classified into cover categories. Ground verification of data was not applied. Vector modeling, geodata compilation, and digital cartography were done with ESRI ArcGIS 9.2 and ArcSDE 9.2. A 1:100,000 settlement, track and path-footprint were extracted based on satellite data provided by Google Earth Pro 4.1.7.
The CDE (University of Bern) would welcome any information that could improve this map. For comments and suggestions, please contact the CDE at info@cde.unibe.ch.
Digital maps, pdf, 8.5x11 inch, and further project information are accessible on CDE's Sudan Map Download Server at <http://www.cde.unibe.ch>.

Please note that when information is used in other mapping products, the source of the map must be credited or cited: CDE, University of Bern, Sudan Topographic Field Map Series 1:250,000, Draft Revision 1 (October 2007), North/South Border Map Series, Bern: CDE, 2007.

