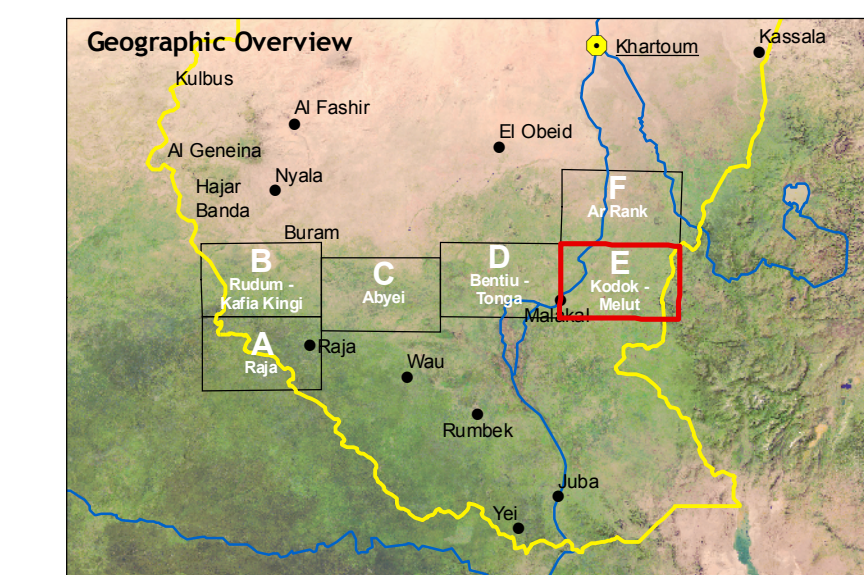




### SUDAN

Topographic Field Map  
North/South Border Map Series

Map sheet: Kodok - Melut  
Upper- / Blue Nile



1:250'000

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

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- Settlements**
  - State capital
  - Principal town
  - Secondary town
  - Administrative town
  - Settlement (verruled)
  - Settlement (not verruled)
  - Built-up area
  - Vulnerable area
  - Settlement (not verruled)
  - Schools
- Infrastructure 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
  - Hill or mountain
  - Tribal area
  - Dinka: Homadic or tribal area
- Geographical features**
  - Hill or mountain
  - Tribal area
  - Dinka: Homadic or tribal area
- Hydrological features**
  - Main river
  - Seasonal river
  - Occasional river
  - Epilotic river
  - Dry river
  - Canal (wet or dry)
  - Canal (unfurnished)
  - Pipeline
  - Borehole
  - Hand drilled
  - Culvert
  - Pond / Pool
  - 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
  - Spore vegetation (single shrubs, grassland)
  - Shrubby vegetation (scrubland)
  - Dense vegetation (forest)
  - Open vegetation (grass, mature crops)
  - Cultivated (irrigated, rainfed)
  - Settlement area (built up area)
  - Quaternary (basement, volcanic)
  - Wetlands (marshes, swamps)
  - Surface Water
  - Specialized wetbeds
- 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 - 850 m
  - 851 - 900 m
  - 901 - 950 m
  - 951 - 1,000 m
  - 1,001 - 1,050 m
  - 1,051 - 1,100 m
  - 1,101 - 1,150 m
  - 1,151 - 1,200 m
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  - 1,701 - 1,750 m
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  - 1,801 - 1,850 m
  - 1,851 - 1,900 m
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**Disclaimer:**  
The boundaries, demarcation 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 1:100,000, 1:200,000, and 1:500,000 covering the tentative border area of the northern and southern parts of Sudan. The map and the geospatial 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, Günther Ullrich, Erika-Wiltraud Emmanuel, Geoprocessing Unit, 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 sensor used: Terra (ASTER) vnr data for 2002-2006, Landsat ETM+ 7+4/2 and Earthstar vnr for IGIS 3/2/1 data for 2000 and Digital Globe QuickBird 2 imagery for 2003-2005.  
Internet sources: Geospatial network of UNCSIS, www.unhcr.org; UNEP, UNLAC, UNMO, UNMA, WFP, OLS data on DERRA server, FAO AffriCover project, Global Name and Geoserver data, Global Wetland Data (GWD), Google Earth Pro, ICGR 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**  
Georeferencing of spatial data was obtained through image-to-image and vector-to-image rectification. Except for the non-digitized area, Sudan's North-South Topography Mission (SNTM) data were used as the principal reference for topographic features and the development of the digital elevation model and the highly detailed drainage model. The DTM has a 90-meter resolution and shows contours (10m intervals), vertical datum (CGRS International), spot heights and a shaded relief. In flat areas the DTM was calculated based on spot heights and contours from map sources. Ground control points were applied for image rectification. Average geometric distortion is estimated to be below +/- 100m, wetlands, rivers, built and other cover were derived from Landsat ETM+, Terra, MODIS (KVI and EVI), and FAO AffriCover data (agriculture). Information was georeferenced and cross-validated. The vector verification of data was applied. River modeling, geodata compilation, and digital cartography were done with ESRI ArcGIS 9.2 and ArcSWAT (v2.0.0). All shore settlements, roads and paths from the map 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](mailto:info@cde.unibe.ch).  
Digital maps, pdf, 8 page files, 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-Release 1 October 2007, North/South Border Map Series, Bern, CDE, 2007.