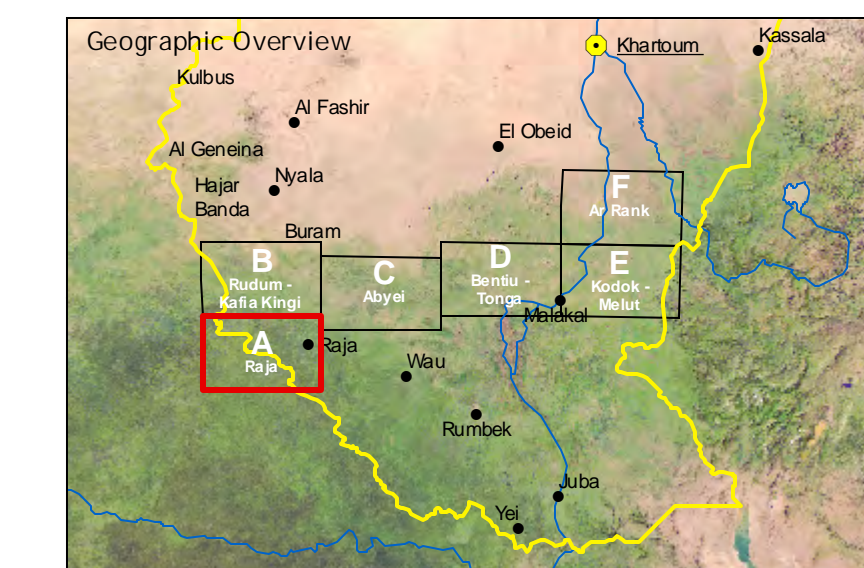


# SUDAN

Topographic Field Map  
North/South Border Map Series

Map sheet: Raja  
Western Bahr el Ghazal, Central African  
Republic



1:250'000

Scale bar: 0 5 10 15 20 km  
Raster Resolution: 90 meters  
UTM Grid: 25 kilometer interval  
Geographic Grid: 30 minutes interval  
Projection: Universal Transverse Mercator (UTM)  
UTM Zone: UTM 25  
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 (overlaid)
  - Settlement (not overlaid)
  - Built-up area
  - Vulnerable area (UNEP, 1991)
  - School
- 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
- 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 (savanna)
    - Dense vegetation (forest, mature crops)
    - Wetlands (irrigated, rainfed)
    - Settlement area (built-up areas)
    - Quaternary (basement, volcanic)
    - Wetlands (swamps, 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
- Political boundaries**
  - National boundary
  - Geographical features
    - Hill or mountain
    - Tribal area
    - Dinka nomadic tribal area
  - Hydrological features
    - Main river
    - Seasonal river
    - Occasional river
    - Episodic river
    - Dry river
    - Canal (wet or dry)
    - Canal (unfurnished)
    - Pipeline
    - Boothole
    - Structure / hand-ditched
    - Culvert
    - Fund / Pool
    - Reservoir
    - Spring
    - Wetland
    - Well

**Disclaimer:**  
The boundaries, denominations and any other information shown on this map do not imply any judgment about the legal status of any territory, or constitute any official endorsement or acceptance of the boundaries by 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 Krauer (ing. Hengstenberg Christian, Geomatics, University of Bern), Erika von Elmendorf, Geomatics 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 images used: Terra / ASTER vnr data for 2002-2006, Landsat ETM+ 7+4/2 and Earthstar Natural View (ES) 3/2/1 data for 2002-2004 (Digital Globe QuickBird 2 imagery for 2003-2005).  
Internal data sources: Geodatabase of UNICEF, www.unicef.org; UNEP, UNLCC, UNHCR, UNHCR, WFP, OLS data on DERRA server; FAO AfricaCover project; Global Name and Gazetteer data; Global Wetland Data (GWD); Google Earth Pro; NCR 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**  
Co-ordinating of spatial data was obtained through image-to-image, point-to-image, and vector-to-image rectification. Except for the non-logging area, SUDA's North-South Border Topography Mission (DSM) data were used as the principal reference for topographic features and the development of the digital terrain and the highly detailed drainage model. The DSM has a 90-meter resolution and shows contours (20m intervals), artificial built-up (20m intervals), lakes, ponds, spot heights and a shaded relief. In flat areas the DSM was calculated based on spot heights and contours from map sources. Ground control points were applied for image registration. Average geometric distortion is estimated to be below +/- 100 m. Wetlands, rivers, built-up areas and other features were derived from Landsat ETM+, Terra MODIS (NDF and EVI), and FAO AfricaCover data (agriculture). Information was checked and verified against the ground truth data and the map sources. River modeling, geodata compilation, and digital cartography were done with ESRI ArcGIS 9.2 and data ESRI/ArcMap 9.1. River settlements, track and path features 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 (map) 1:250,000, Draft Release 1 (October 2007), North/South Border Map Series, Bern, CDE, 2007.

