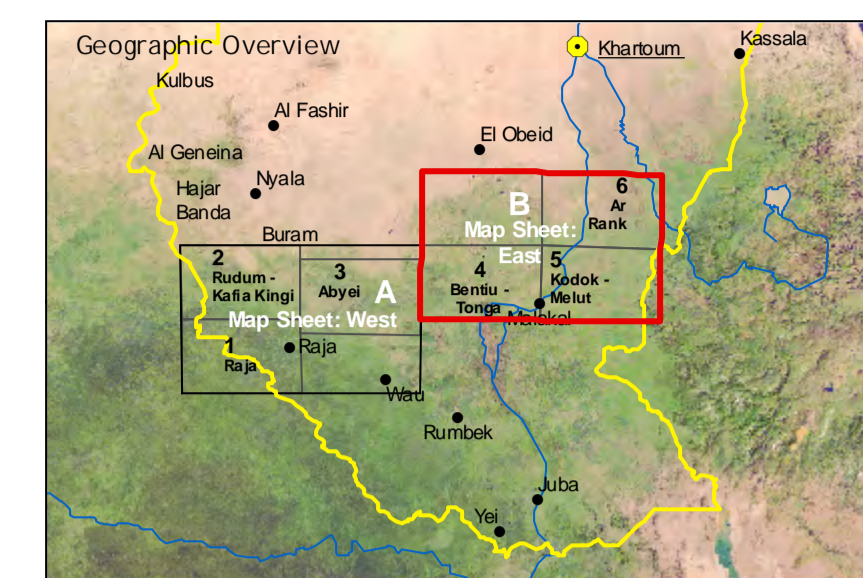


SUDAN

Topographic Overview Map North/South Border Map Series

Map Sheet: East

West-, North-, South Kordofan, Sennar, Jonglei
Western-, Upper-, White-, Blue Nile



1:500'000

Scale bar: 0, 20, 40, 60 km
Raster Resolution: 90 meters
UTM Grid: 50 kilometer interval
Geographic Grid: 1 degree interval
Projection: Universal Transverse Mercator (UTM)
UTM Zone: UTM 35
Latitude of Origin: 27 degrees 00' minutes E of Greenwich
Longitude of Origin: 33 degrees 00' minutes E of Greenwich
Horizontal Datum: WGS84
Vertical Datum: Mean sea level
Spheroid: WGS84

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Settlements		Political boundaries	
● State capital	— National boundary	— National boundary	— National boundary
● Principal town	— Geographical boundary	— Geographical boundary	— Geographical boundary
● Secondary town	— Hill or mountain	— Hill or mountain	— Hill or mountain
● Administrative town	— Tribal area	— Tribal area	— Tribal area
● Settlement (verified)	— Dinka / Nomadic or tribal area	— Dinka / Nomadic or tribal area	— Dinka / Nomadic or tribal area
● Settlement (not verified)	— Dinka / Nomadic or tribal area	— Dinka / Nomadic or tribal area	— Dinka / Nomadic or tribal area
Infrastructure features		Hydrological features	
— Main road (CDE)	— Main river	— Main river	— Main river
— Gravel / Dirt road (CDE)	— Seasonal river	— Seasonal river	— Seasonal river
— Track (CDE)	— Occasional river	— Occasional river	— Occasional river
— Railway (CDE)	— Episodic river	— Episodic river	— Episodic river
— Main road (ES)	— Dry river	— Dry river	— Dry river
— Gravel road (ES)	— Canal (unflushed)	— Canal (unflushed)	— Canal (unflushed)
— Street (ES)	— Pipeline	— Pipeline	— Pipeline
— Dirt road or track (ES)	— Borehole	— Borehole	— Borehole
— Bridge	— Culvert	— Culvert	— Culvert
— River crossing	— Reservoir	— Reservoir	— Reservoir
	— Spring	— Spring	— Spring
	— Waterhole	— Waterhole	— Waterhole
	— Well	— Well	— Well
	— Wetland	— Wetland	— Wetland
Elevation classes		Land cover classes	
— Spot height	— Sparse vegetation (single shrubs, grassland)	— Sparse vegetation (single shrubs, grassland)	— Sparse vegetation (single shrubs, grassland)
— Main contour (100 m interval)	— Shrubby vegetation (scrubland)	— Shrubby vegetation (scrubland)	— Shrubby vegetation (scrubland)
— Intermediate contour (25 m interval)	— Dense vegetation (savanna, medium crops)	— Dense vegetation (savanna, medium crops)	— Dense vegetation (savanna, medium crops)
— Supplementary contours (25 m interval)	— Agriculture (irrigated, rainfed)	— Agriculture (irrigated, rainfed)	— Agriculture (irrigated, rainfed)
— below 400 m	— Settlement area (built-up area)	— Settlement area (built-up area)	— Settlement area (built-up area)
— 401 - 499 m	— Quaternary (basement, volcanic)	— Quaternary (basement, volcanic)	— Quaternary (basement, volcanic)
— 500 - 599 m	— Wetlands (marshes, swamps)	— Wetlands (marshes, swamps)	— Wetlands (marshes, swamps)
— 600 - 699 m	— Surface Water (perennial waterbodies)	— Surface Water (perennial waterbodies)	— Surface Water (perennial waterbodies)
— 700 - 799 m			
— 800 - 899 m			
— 900 - 999 m			
— 1,000 - 1,099 m			
— 1,100 - 1,199 m			
— 1,200 - 1,299 m			
— 1,300 - 1,399 m			
— 1,400 - 1,499 m			
— 1,500 - 1,599 m			
— 1,600 - 1,699 m			
— 1,700 - 1,799 m			
— 1,800 - 1,899 m			
— 1,900 - 1,999 m			
— above 2,000 m			

Disclaimer:
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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 1:500,000, 1:250,000, and 1:100,000 covering the tentative border area of the northern and southern parts 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: Hishi Christoph, Krasser Jörg, Heugarten Chistian, Gampert Ursula, Ehrhwein Emanuel, Geoprocessing Unit, Centre for Development and Environment, Institute of Geography, University of Bern

Technical data sources
Imagery 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 sensors used: Terra / ASTER-vnir data for 2002-2006, Landsat ETM+ 7+/4/2 and Landsat TM/RS 5+/3/2/1 data for 2000 and Digital Globe QuickBird 2 imagery for 2005.
Internet sources: Geolinkwork of UNOCHA, www.unocha.org; UNICEF, UNICEF; UNMAS, UNMAS; WFP, WFP; FAO, FAO; Global Wetland Data (GLWD), Google Earth Pro, NCCR North-South and individual communications within the international aid community.
Map sources: Cartographic Information Service (ECS), Minneapolis, USA
Other sources consulted: In particular the Topographic Map Series 1:250,000 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 1976).

Data compilation
Georeferencing of spatial data was obtained through image-to-image and vector-to-vector registration. Forest for the non-shrub area, NAD83 UTM 35 North-South Topographic Mission (STN) data were used as the principal reference for topographic features and the development of the digital terrain and the highly detailed drainage model. The DTM has a 90-meter resolution and shows contours (5m interval, additional bench marks/intersects, slope, aspect, spot heights and a shaded relief). In flat areas the DTM was calculated based on spot heights and contours from map sources. Contour points were not applied by image registration. Average spot height error is estimated to be below +/- 100 m.
Wetlands, forest, bush and shrub cover were derived from Landsat ETM+, Terra MODIS (V2 and V1), and FAO ARCCover data (spatially). Information was classified and cross-validated. In situ verification of data was not applied. Raster modeling, besides contour interpolation, and digital cartography were done with ESRI ArcGIS 9.2 and Leica ERDAS IMAGINE 9.1. Minor settlement, track and path features were extracted based on satellite data provided by Google Earth Pro 4.2.7.
The CDE (University of Bern) would welcome any information that could improve this map. For comments and suggestions, please contact the CDE at <http://www.cde.unibe.ch>, Digital map, pdf, 8 file files, and further project information are accessible on the 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 as: CDE, University of Bern, Sudan Topographic Overview Map (map) 1:500,000, (Draft Release 1 October 2007, North/South Border Map Series, Bern, CDE, 2007.

