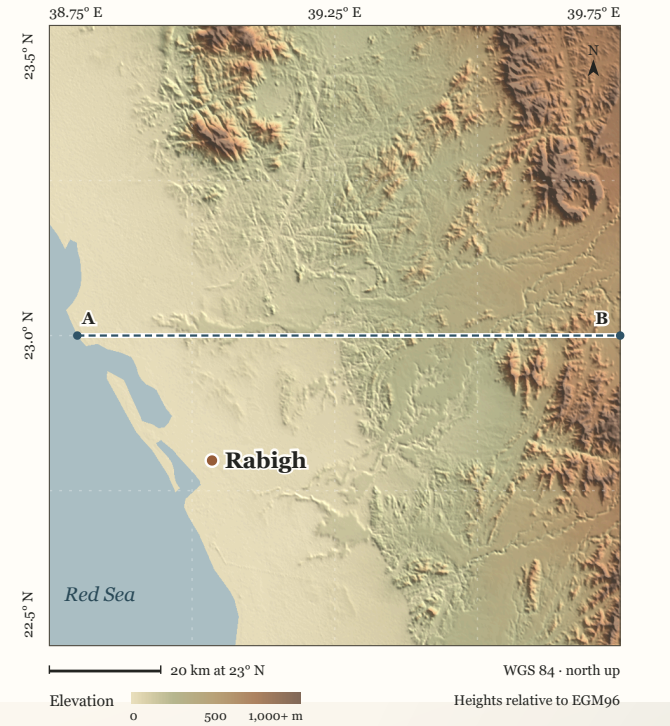
WESTERN ARABIAN PENINSULA

Rabigh

Regional water briefing

Terrain, rainfall and the evidence needed below ground



A–B follows the 23° N parallel north of Rabigh. Colours progress from pale coastal lowlands to darker uplands.

The regional picture

53.7 mm

Mean annual estimated rainfall over mapped land, 2001–2020.

81.3%

Share of estimated rainfall falling from October through March.

9,962 km²

Mapped land inside the study window. The rectangle also includes part of the Red Sea.

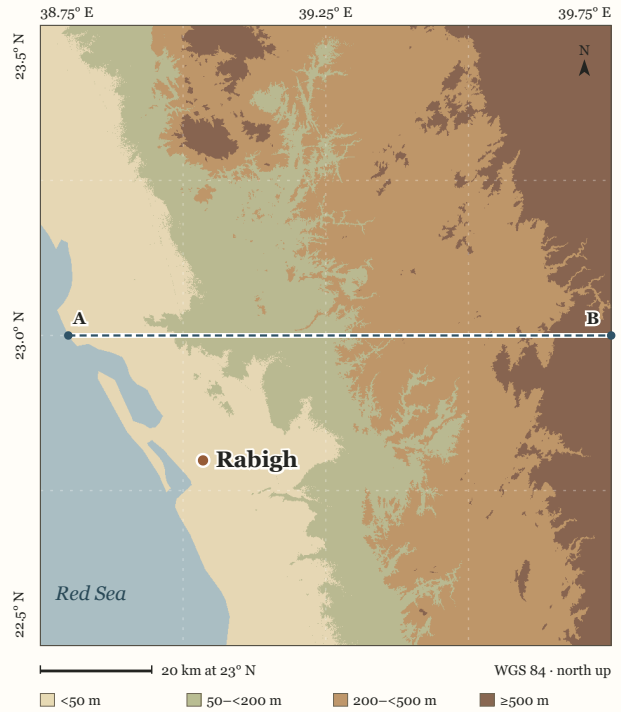
> Annual and monthly averages provide a regional baseline. Site planning requires local storm, survey and groundwater observations.

Study window 22.50–23.50° N · 38.75–39.75° E
Rainfall, 2001–2020 · Elevation, February 2000 · Briefing issued November 2026

TERRAIN · FEBRUARY 2000

The rise inland

Along 23° N, the sampled land surface rises from 0 m at the mapped coast to 588 m at the eastern boundary. Ridges and lower intervening ground interrupt the ascent.



Four elevation bands on the SRTM grid. Blue denotes sea. A–B locates the profile below.

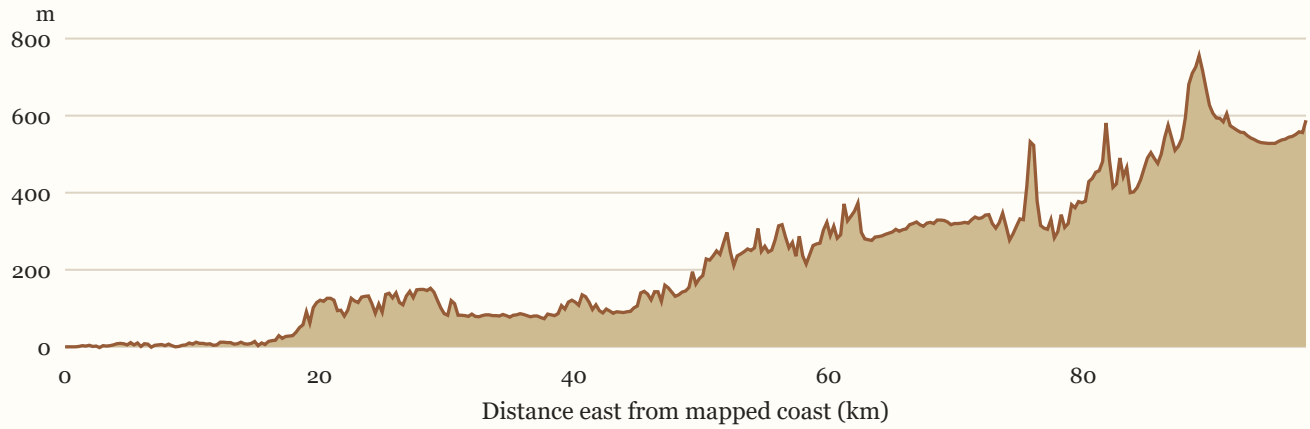
Land in each band

Below 50 m	**22.1%**
50 to <200 m	**21.8%**
200 to <500 m	**37.9%**
500 m and above	**18.3%**

The largest band is 200 to below 500 m. It covers 3,774 km², or 37.9% of classified land.

The regional raster's land posts span -24 to 1,758 m. Low coastal values are sensitive to radar error and shoreline placement.

Elevation along A–B



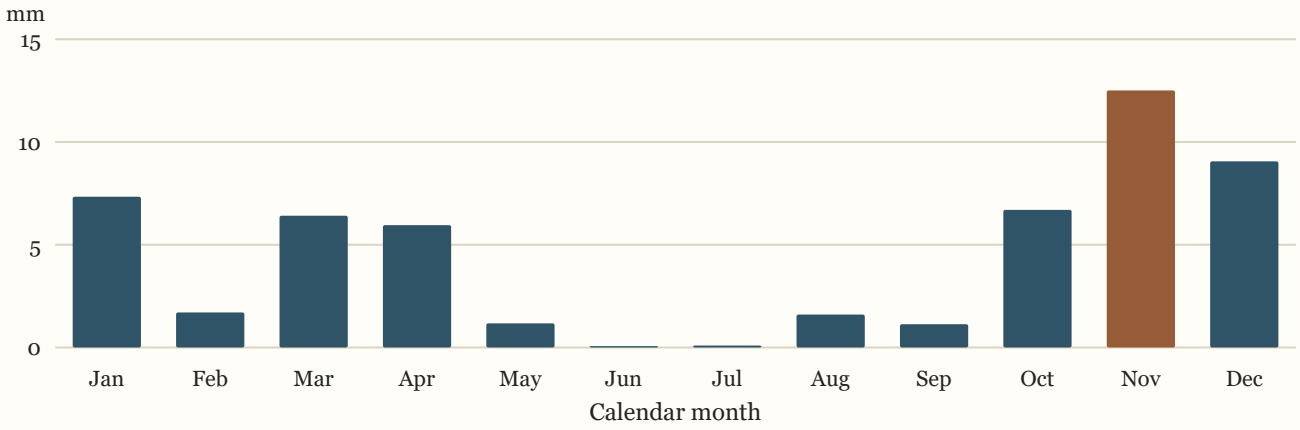
Distance along the 23° N parallel from 38.799° E to 39.75° E. Of 361 sampled points, the highest reaches 756 m at 89.1 km. The profile covers 97.5 km. Elevations are relative to EGM96.

RAINFALL · 2001–2020

When rain falls

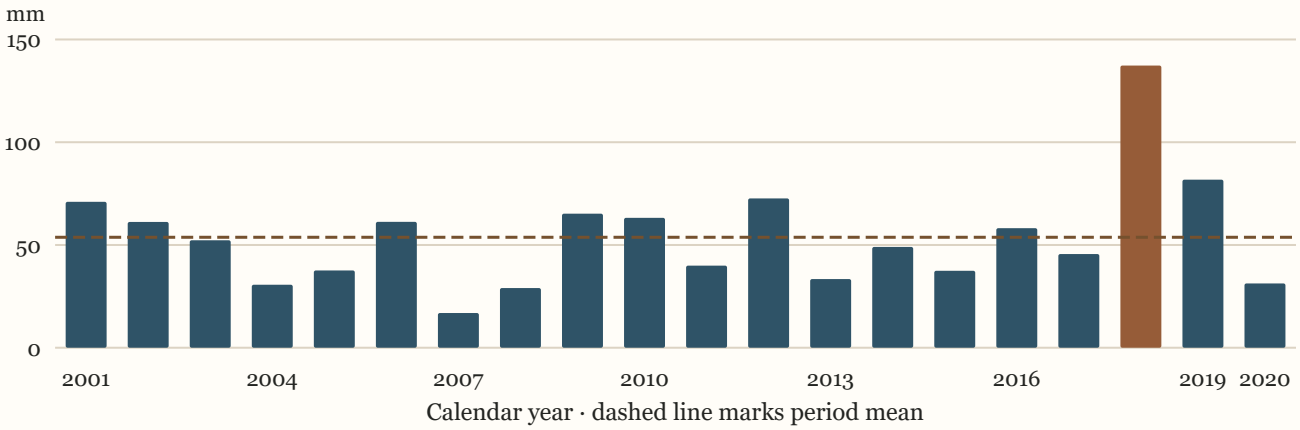
Over the period, November averaged 12.5 mm and accounted for 23.3% of all estimated rain. June and July each averaged less than 0.1 mm.

Average month



Each bar averages 20 regional monthly totals. The copper bar marks November.

Annual totals



Each bar sums 12 monthly regional depths. The dashed line is the period mean. The copper bar marks the wettest year.

> The driest year was 2007 at 16.9 mm. The wettest was 2018 at 137.3 mm. November 2018 alone contributed 66.5 mm.

The mean was 53.7 mm/year and the median was 50.7 mm/year. These are gridded regional estimates. They do not give rainfall at an individual gauge or identify a storm's peak intensity.

MONTHLY DATA · ESTIMATED DEPTHS IN MM

Twenty years of rain

Read down a column to compare the same month across years. Read across a row to see how individual months contributed to that year's total.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2001	4.8	3.2	12.7	0.0	0.0	0.0	0.0	7.2	2.3	0.1	2.8	37.9	71.0
2002	5.4	0.9	22.8	6.9	0.0	0.0	0.0	1.4	1.1	0.4	19.6	2.7	61.2
2003	6.5	1.0	1.8	1.5	0.0	0.0	0.0	2.4	0.0	0.1	37.2	1.8	52.3
2004	7.2	3.3	2.9	0.7	0.0	0.0	0.0	0.0	0.2	2.7	11.0	2.6	30.6
2005	11.6	0.6	1.7	17.2	0.5	0.0	0.1	0.9	0.3	0.1	0.3	4.5	37.6
2006	6.4	4.9	1.6	13.2	2.1	0.0	0.0	1.2	2.2	28.0	0.3	1.4	61.3
2007	5.9	0.7	4.8	1.9	0.8	0.0	0.0	0.1	0.0	0.1	0.2	2.4	16.9
2008	14.9	0.6	1.6	5.9	0.4	0.0	0.0	0.0	2.2	0.1	1.7	1.6	29.0
2009	5.5	1.3	1.5	0.5	0.1	0.0	0.0	5.4	0.0	2.8	29.9	18.2	65.2
2010	6.0	1.9	3.9	7.0	0.5	0.0	0.0	0.0	1.8	0.1	0.1	41.9	63.2
2011	14.6	0.6	13.9	8.0	0.2	0.0	0.0	0.0	0.2	0.2	0.1	2.0	39.9
2012	3.7	2.3	1.5	10.1	7.2	0.0	0.6	0.6	0.0	25.7	18.3	2.6	72.7
2013	10.3	0.8	2.5	0.4	0.0	0.0	0.0	0.5	0.0	0.1	14.5	4.2	33.4
2014	11.5	0.6	6.9	8.1	3.5	0.0	0.0	0.9	0.6	0.1	13.9	2.9	49.1
2015	3.9	0.8	2.5	0.0	0.2	0.0	0.0	4.3	1.6	12.3	2.7	9.1	37.4
2016	4.1	1.3	5.6	25.6	0.1	0.0	0.0	1.4	0.7	8.3	0.8	10.3	58.2
2017	5.3	3.3	1.5	11.0	2.1	0.0	0.2	3.8	0.9	0.1	15.8	1.8	45.6
2018	4.8	3.2	5.5	0.0	0.7	0.0	0.0	0.4	3.8	35.0	66.5	17.4	137.3
2019	10.3	1.2	30.9	0.7	1.1	1.3	0.0	0.0	2.8	17.8	14.0	1.6	81.8
2020	4.0	1.5	2.0	0.4	3.8	0.0	1.0	1.6	1.9	0.1	0.6	14.3	31.3

Monthly mm <1 1–<5 5–<15 15–<35 ≥35

Classes use unrounded depths. Printed values are rounded to 0.1 mm. A displayed 0.0 may include positive depths below 0.05 mm. Annual totals use the unrounded monthly values. The downloadable CSV retains precision.

FIELD EVIDENCE

What the grids leave open

Elevation and rainfall help frame a groundwater investigation. A local aquifer interpretation needs observations below the surface, tied to time, location and a common elevation reference.

Boreholes & aquifer units

Which materials can store or transmit water? Match lithology and construction logs to surveyed well locations, drilled depths and screened intervals.

Separate distinct water-bearing units before comparing nearby wells. A surface elevation band alone supplies no evidence of subsurface continuity.

Water levels & gradients

Where does groundwater move? Measure static water levels over the same short period in wells screened in comparable units. Record measuring-point elevations, vertical datum, time and nearby pumping.

Convert depth to hydraulic head before mapping gradients. Repeat the survey to distinguish persistent gradients from short-lived pumping effects.

Salinity & water chemistry

Does water quality vary inland or with depth? Pair temperature-corrected electrical conductivity with laboratory chloride and major-ion results. Retain sampling depth, well construction, date, units and quality-control records.

A coastal salinity gradient could have several causes. Evaluate chemistry alongside heads, pumping history and repeat samples before assigning an origin.

Recharge & well response

How do wells respond to rainfall and pumping? Pair local rain and stream-stage observations with groundwater hydrographs and abstraction records. For hydraulic properties, obtain pumping rates, drawdown and recovery observations.

Compare event timing and response across wells in the same unit. Quantifying recharge requires an explicit water balance or calibrated model and a stated uncertainty.

Field-method reference for water levels and well documentation. Cunningham & Schalk (2011), Groundwater Technical Procedures.

ANALYSIS RECORD

How to reproduce the results

Window and land support. 22.50–23.50° N · 38.75–39.75° E, WGS 84. Intersect 20 × 20 nominal 0.05° cells with Natural Earth land. Measure clipped areas in EPSG:6933. 366 cells contribute across every month, representing 9,962.1 km² to the stated precision.

Rainfall. Multiply each valid cell's monthly depth by its land area, sum, and divide by the total covered land area. Use common valid support. Preserve zero rainfall. Sum 12 monthly depths per calendar year and average each calendar month over 20 years. Percent shares use unrounded values.

Terrain. Mosaic four original 1 arc-second point grids in WGS 84 and keep the native spacing. Heights are metres above the EGM96 geoid. Weight classified posts by their latitude-dependent cell areas. Half-width cells at the regional edges approximate area within the window. The native land mask classifies 9,961.6 km².

Profile. Begin at the western edge of the continuous mapped land segment ending at 39.75° E on 23° N. Sample 361 equally spaced longitudes using nearest elevation posts. Compute distance along the WGS 84 parallel.

Data credits

Climate Hazards Center, University of California, Santa Barbara. CHIRPS v3.0 final monthly estimates. Dataset published in 2025. Dataset DOI.

NASA Jet Propulsion Laboratory. SRTMGL1.003, Global 1 Arc Second V003. Access facilitated by OpenTopography. Dataset DOI. Distribution DOI.

Natural Earth. 1:10m physical land polygons, v5.1.1. Public domain. Clipped for land weighting and cartography. Land polygons.

GeoNames. Rabigh populated-place coordinates, record 103035. Used under CC BY 4.0. Place record.

Public data accessed 21 November 2026.
CHIRPS methods paper · GeoNames CC BY 4.0 licence

> The ZIP includes both clipped GeoTIFFs, shoreline and locator geometry, six CSV tables, six map and chart plates, the source file inventory and an offline rebuild script. Open REPRODUCE.txt for commands and input definitions.