

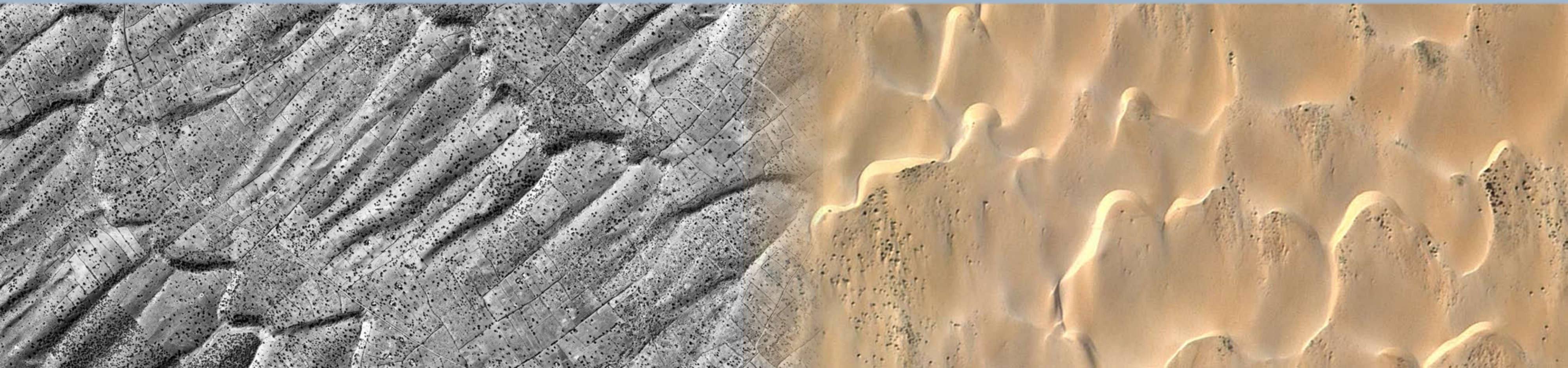
भूमंडलीय रेत के टीलों का भूदृश्य

भारतीय सुदूर संवेदन उपग्रहों द्वारा देखा गया

GLOBAL SAND DUNE LANDSCAPES

As Viewed by Indian Remote Sensing Satellites

2021



राष्ट्रीय सुदूर संवेदन केंद्र (एनआरएससी) / भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) अपने क्षेत्रीय केंद्रों यथा बेंगलुरु, नागपुर, कोलकाता, जोधपुर और नई दिल्ली के साथ हैदराबाद में स्थित है।
एनआरएससी सुदूर संवेदन आंकड़ों के अर्जन, संसाधन एवं अनुप्रयोग व विकास के लिए उत्तरदायी है।

National Remote Sensing Centre (NRSC)/Indian Space Research Organisation (ISRO) with campuses at Hyderabad along with its Regional Centres Bengaluru, Nagpur, Kolkata, Jodhpur and New Delhi, is a nodal agency for remotely sensed data acquisition, processing and application development. NRSC is responsible for:

- Satellite data acquisition, planning, reception, processing and dissemination to user community.
- Aerial Surveys, Large Scale Mapping, Cartography and Digital data services.
- Setting up International data reception Ground Stations and operating data reception ground station at Antarctica.
- Remote Sensing Application and Geospatial solutions to user departments in the field of Agriculture, Land Use & Land Cover, Forestry & Ecology, Rural & Urban Studies, Land, Ocean & Atmospheric Studies and Geosciences.
- Disaster Preparedness and Emergency Response support services.
- Bhuvan Geospatial Services.





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बालानगर प्रधान कार्यालय Balanagar Head Office



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जनसंपर्क सुविधा, जीडिमेट्ला Outreach facility, Jeedimetla



Bhuvan as

Geo Spatial Mapping
and Satellite Data
Visualization Platform

Bhuvan as

Strong Geospatial
Platform for
GIS applications

Bhuvan as

Platform for
Government agencies
to host the data



Mobile Application and Web Development

Open Data Archive, Rich Thematic Data as OGC Web
Services, and Disaster Management Information Support

Bhuvan Applications for various sectors

Agriculture

Forestry

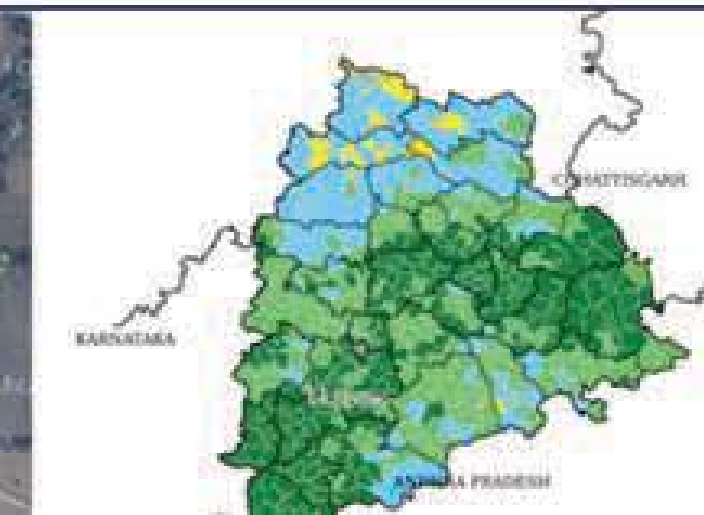
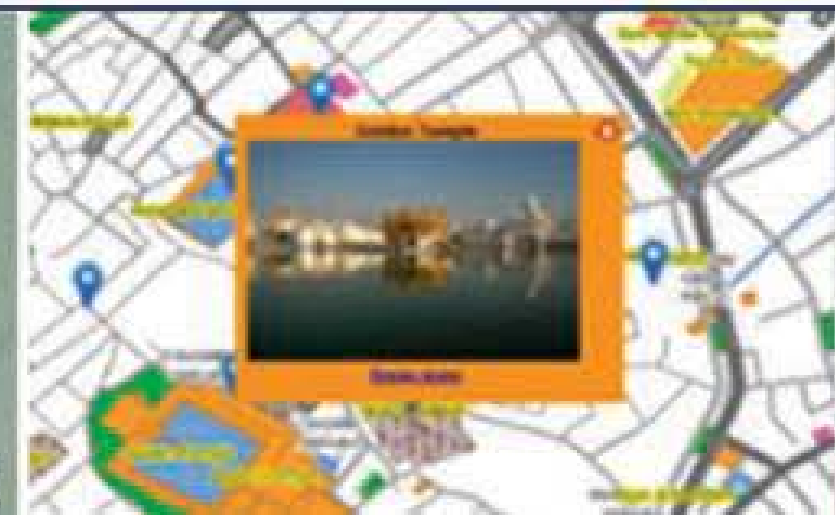
Water

Tourism

Urban

Rural

Education



Visit : <https://bhuvan.nrsc.gov.in>

About Bhoonidhi

Bhoonidhi is ISRO’s Open Data Access web application to facilitate the dissemination of free satellite data products to online users on web.

- ### Key Features
- From the list of available satellites user can select any of the sensors and download the products
 - User friendly AOI specific search options based on Free draw, shape file, polygon, points and location
 - Cart based download with both GUI and batch downloading options
 - Cloud threshold filters for Landsat-8 data
 - In addition to ISRO’s satellite data, products from data providers like USGS/ESA

Satellite Data Availability

SATELLITE	SENSOR
LANDSAT-8	OLI+TIRS - From 1st Jan, 2019
SENTINEL-1A	IW: VV+VH(L1-GRD) - From 1st Oct, 2019
SENTINEL-1B	IW: VV+VH(L1-GRD) - From 1st Oct, 2019
SENTINEL-2A	MSI (L-1C) - From 1st Oct, 2019
SENTINEL-2B	MSI (L-1C) - From 1st Oct, 2019
OCEANSAT-2	OCM-GAC - From 1st Jan, 2019

AOI Specification

Location / Point / Polygon / Shapefile based Target area Identification

Search Options

Resolution based / Time series based / Event Based / Satellite based

Map Tool

Free Draw, Draw Marker / Image foot-print / Map layer selection / publish on Map / Zoom to center

Cart Management

Adding / Deleting / Confirming products available date wise to online users

Download Options

GUI based https download and Batch downloader (automatically downloading of products confirmed in cart)

Instant / Delayed download

Archives view for displaying frequency of data collection available in archive using color code

Download rules

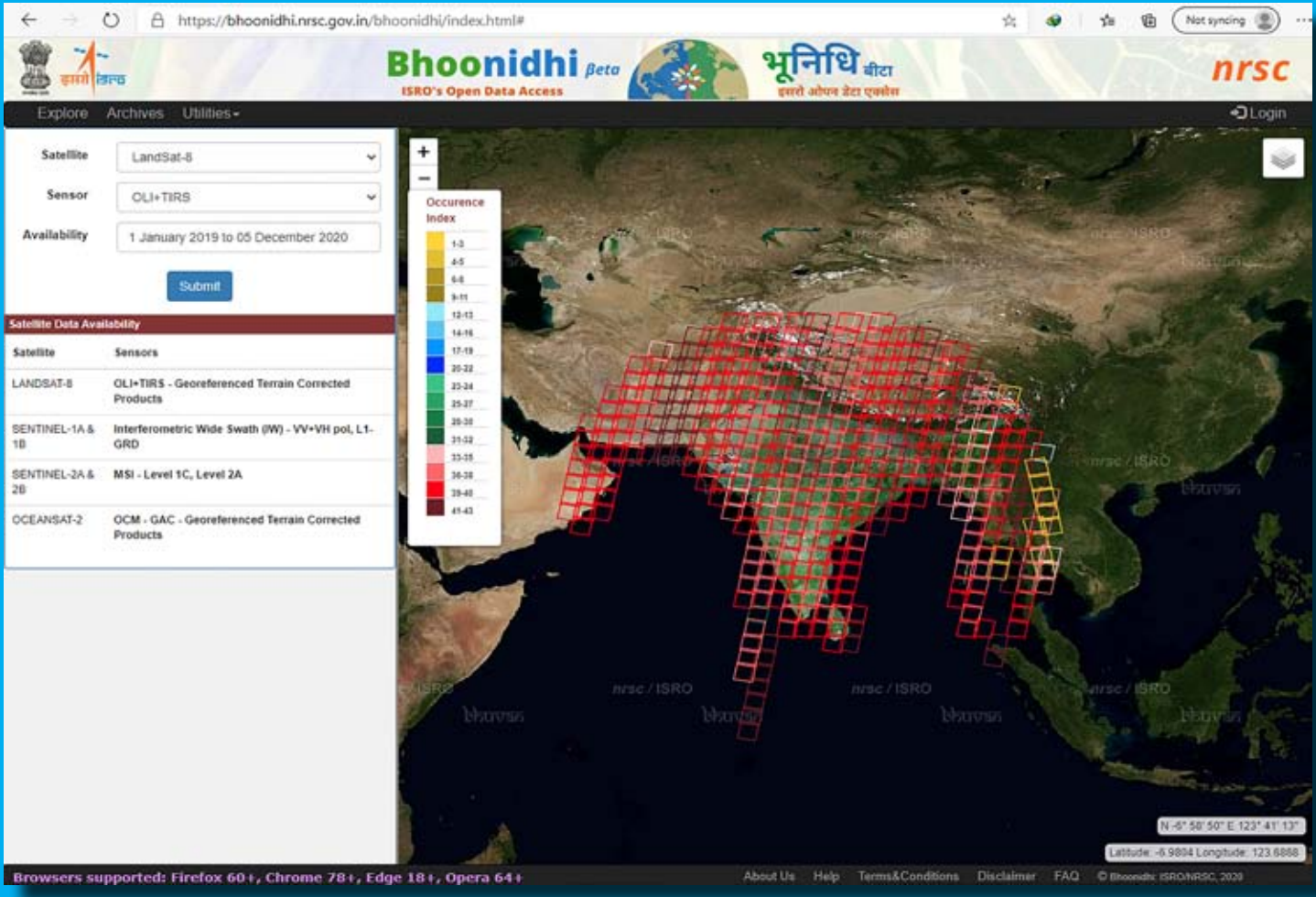
Aimed at servicing maximum products to maximum online users

Reporting Tool

Peak Response time, Bandwidth, Data served / Day, unique users, Min-Max page load time

Feedback mechanism

Data usage application- once for every session, General feedback on performance, Navigation, user friendliness etc



- User Friendly Data search options
- Instant / Delayed download
- UI based / Batch product Cart Interface
- Cart Interface
- User Intimation
- Meta data download
- Feedback mechanism
- Interactive map drawing tool
- Statistical reporting tool

भूमंडलीय रेत के टीलों का भूदृश्य

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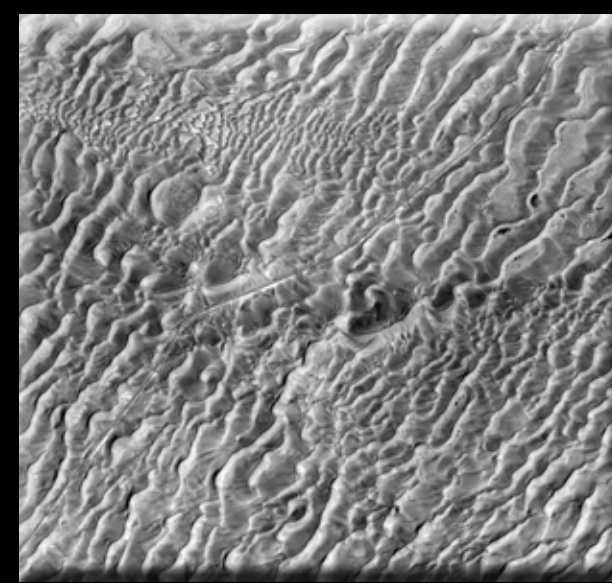
थार रेगिस्तान, भारत
Thar Desert, India



सहारा रेगिस्तान, अफ्रीका
Sahara Desert, Africa



अरब रेगिस्तान, सऊदी अरब
Arabian Desert, Saudi Arabia



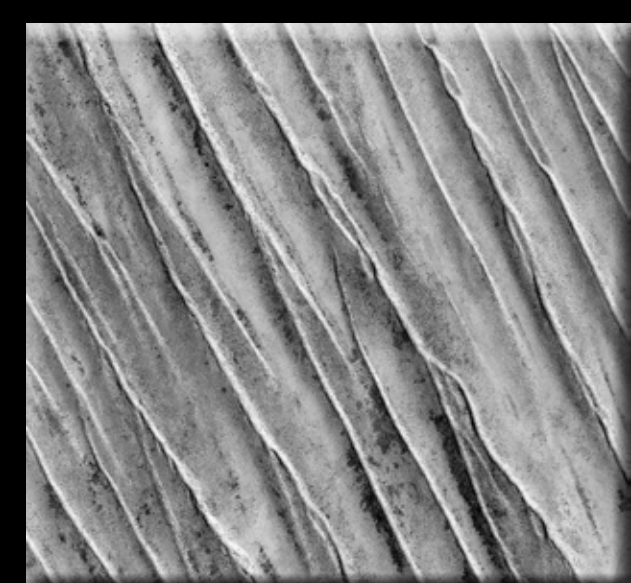
गोबी रेगिस्तान, चीन
Gobi Desert, China



नामीब रेगिस्तान, दक्षिण अफ्रीका
Namib Desert, South Africa



अरब रेगिस्तान, सऊदी अरब
Arabian Desert, Saudi Arabia



विशाल विक्टोरिया रेगिस्तान, ऑस्ट्रेलिया
Great Victoria Desert, Australia



तकलामकन रेगिस्तान, चीन
Taklamakan Desert, China



सहारा रेगिस्तान, अफ्रीका
Sahara Desert, Africa



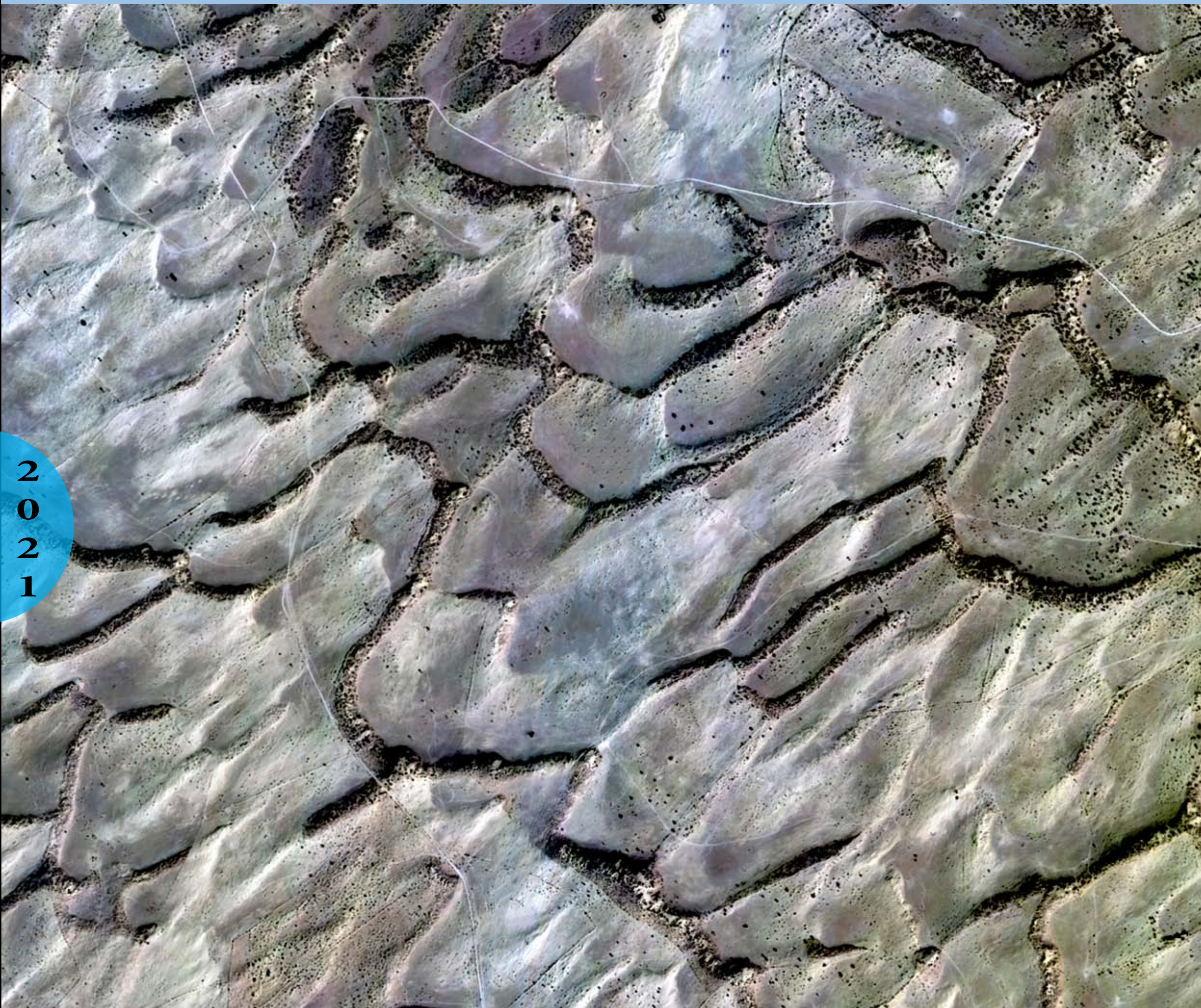
अरब रेगिस्तान, सऊदी अरब
Arabian Desert, Saudi Arabia



अटाकामा रेगिस्तान, दक्षिण अमेरिका
Atacama Desert, South America



थार रेगिस्तान, भारत
Thar Desert, India



2021

Transverse dunes in Bikaner region of Rajasthan, India. Slope of the dune surface indicates regional wind action along northeast direction.

Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुस्वार	Friday शुक्रवार	Saturday शनिवार
					1 New Year's Day	2
3	4	5	6	7	8	9
10	11	12	13	14 Pongal	15	16
17	18	19	20	21	22	23
24	25	26 Republic Day	27	28	29	30
31						

December 2020							टिप्पणियाँ Notes	February 2021							
S	M	T	W	T	F	S		S	M	T	W	T	F	S	
		1	2	3	4	5			1	2	3	4	5	6	
6	7	8	9	10	11	12			7	8	9	10	11	12	13
13	14	15	16	17	18	19			14	15	16	17	18	19	20
20	21	22	23	24	25	26			21	22	23	24	25	26	27
27	28	29	30	31					28						

Thar Desert, also known as the Great Indian Desert, is the 17th largest desert of the world and lies in the arid region in the northwestern part of the Indian subcontinent. It covers an area of 200,000 sq.km including India and Pakistan.



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Clustered barchan dunes of Great Sand Sea in Egypt, Africa. They are aligned to form barchanoid ridges by prevailing wind from north.

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फरवरी February 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

January 2021							टिप्पणियाँ Notes	March 2021						
S	M	T	W	T	F	S		S	M	T	W	T	F	S
					1	2			1	2	3	4	5	6
3	4	5	6	7	8	9		7	8	9	10	11	12	13
10	11	12	13	14	15	16		14	15	16	17	18	19	20
17	18	19	20	21	22	23		21	22	23	24	25	26	27
24	25	26	27	28	29	30		28	29	30	31			
31														

Sahara Desert is the third largest desert of the world with an area of 9,200,000 sq.km. It is spread from Morocco in the west to Egypt in the east of the northern African Continent. It is the largest hot desert.

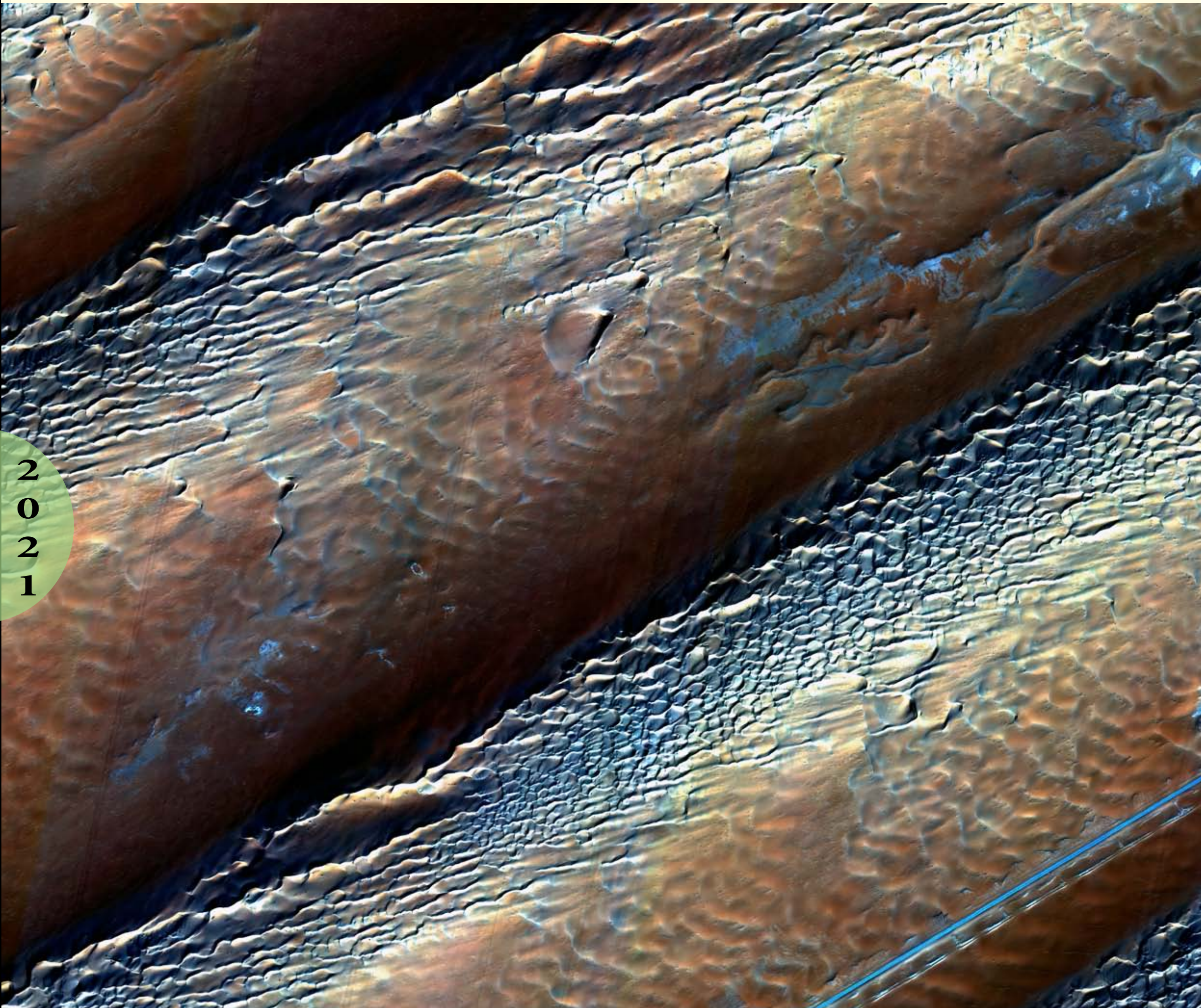
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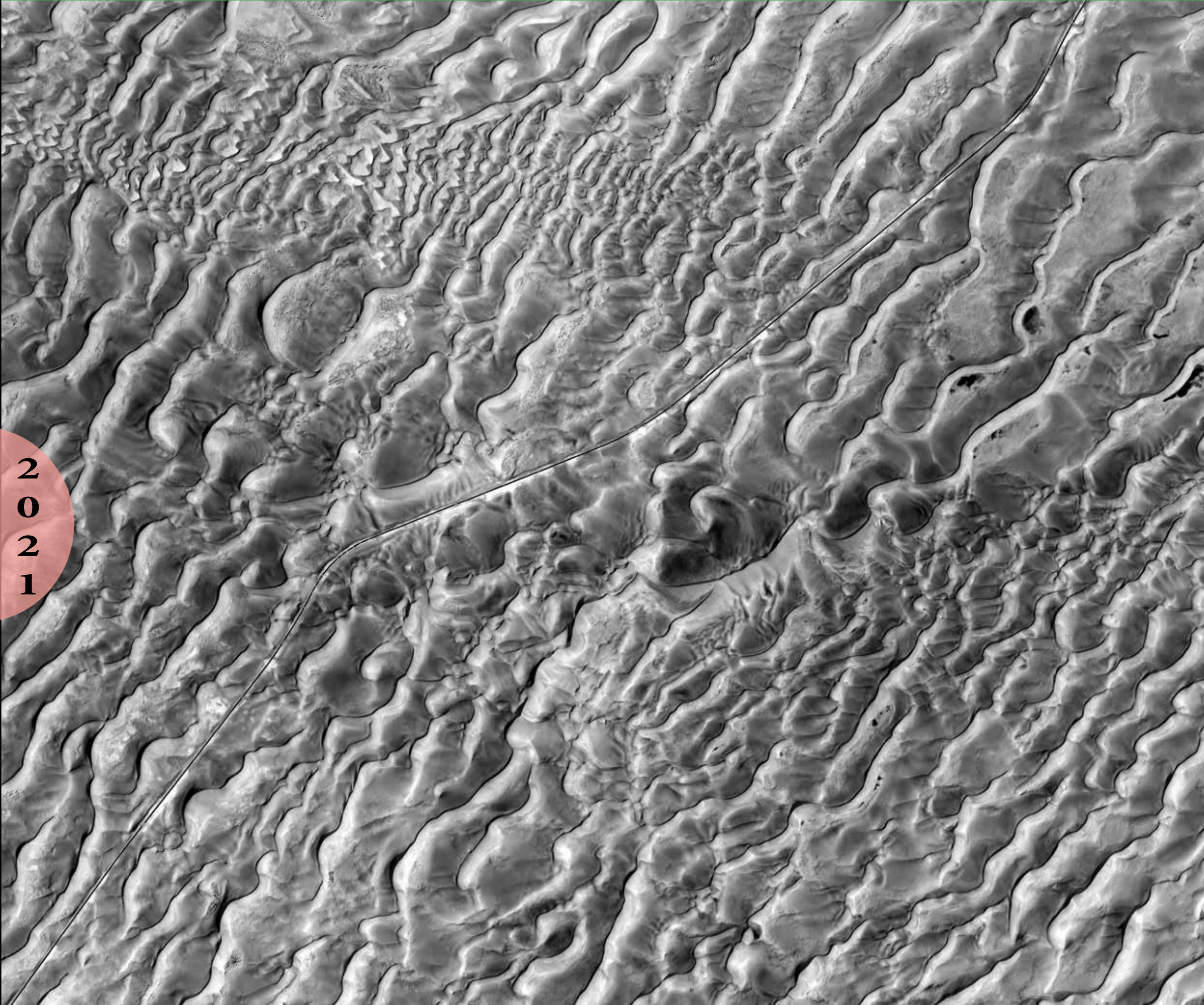
2021

Longitudinal dunes in Rub Al Khali Desert in Saudi Arabia. They have formed parallel to the strong bimodal wind to northeast.

Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरूवार	Friday शुक्रवार	Saturday शनिवार
	1	2	3	4	5	6
7	8	9	10	11 Maha Sivaratri	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February 2021							टिप्पणियाँ Notes	April 2021						
S	M	T	W	T	F	S		S	M	T	W	T	F	S
	1	2	3	4	5	6						1	2	3
7	8	9	10	11	12	13		4	5	6	7	8	9	10
14	15	16	17	18	19	20		11	12	13	14	15	16	17
21	22	23	24	25	26	27		18	19	20	21	22	23	24
28								25	26	27	28	29	30	

Arabian Desert is a vast desert wilderness in western Asia. It stretches from Yemen to the Persian Gulf and Oman to Jordan and Iraq. It occupies most of the Arabian Peninsula, with an area of 2,330,000 sq.km.



Compound transverse mega dunes and barchanoid dunes in eastern Gobi Desert, south of Mangolia. At places, star dunes also have developed under a variable wind regime.

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अप्रैल April 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
				1	2 Good Friday	3
4	5	6	7	8	9	10
11	12	13 Ugadi	14	15	16	17
18	19	20	21 Ram Navami	22	23	24
25 Mahavir Jayanti	26	27	28	29	30	

March 2021							टिप्पणियाँ Notes	May 2021						
S	M	T	W	T	F	S		S	M	T	W	T	F	S
	1	2	3	4	5	6								1
7	8	9	10	11	12	13		2	3	4	5	6	7	8
14	15	16	17	18	19	20		9	10	11	12	13	14	15
21	22	23	24	25	26	27		16	17	18	19	20	21	22
28	29	30	31					23	24	25	26	27	28	29
								30	31					

Gobi Desert is a large desert or brushland region in East Asia with an area of 1,295,000 sq.km. It covers parts of northern and northeastern China and of southern Mongolia. The Gobi is a rain shadow desert

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2021

A series of complex barchan dunes with sabkha deposits in coastal Namib Desert. Dune coalescence dynamics lead to transverse dune ridges indicating southerly wind.

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मई May 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
						1 Labour Day
2	3	4	5	6	7	8
9	10	11	12	13	14 Eid-ul-fitar	15
16	17	18	19	20	21	22
23	24	25	26 Budha Purnima	27	28	29
30	31					

April 2021							टिप्पणियाँ Notes	June 2021							
S	M	T	W	T	F	S		S	M	T	W	T	F	S	
				1	2	3				1	2	3	4	5	
4	5	6	7	8	9	10			6	7	8	9	10	11	12
11	12	13	14	15	16	17			13	14	15	16	17	18	19
18	19	20	21	22	23	24			20	21	22	23	24	25	26
25	26	27	28	29	30			27	28	29	30				

The Namib Desert is a coastal desert in southern Africa and occupies an area of 80,950 sq.km. It stretches for more than 1,600 km along the Atlantic coasts of Angola, Namibia and South Africa.

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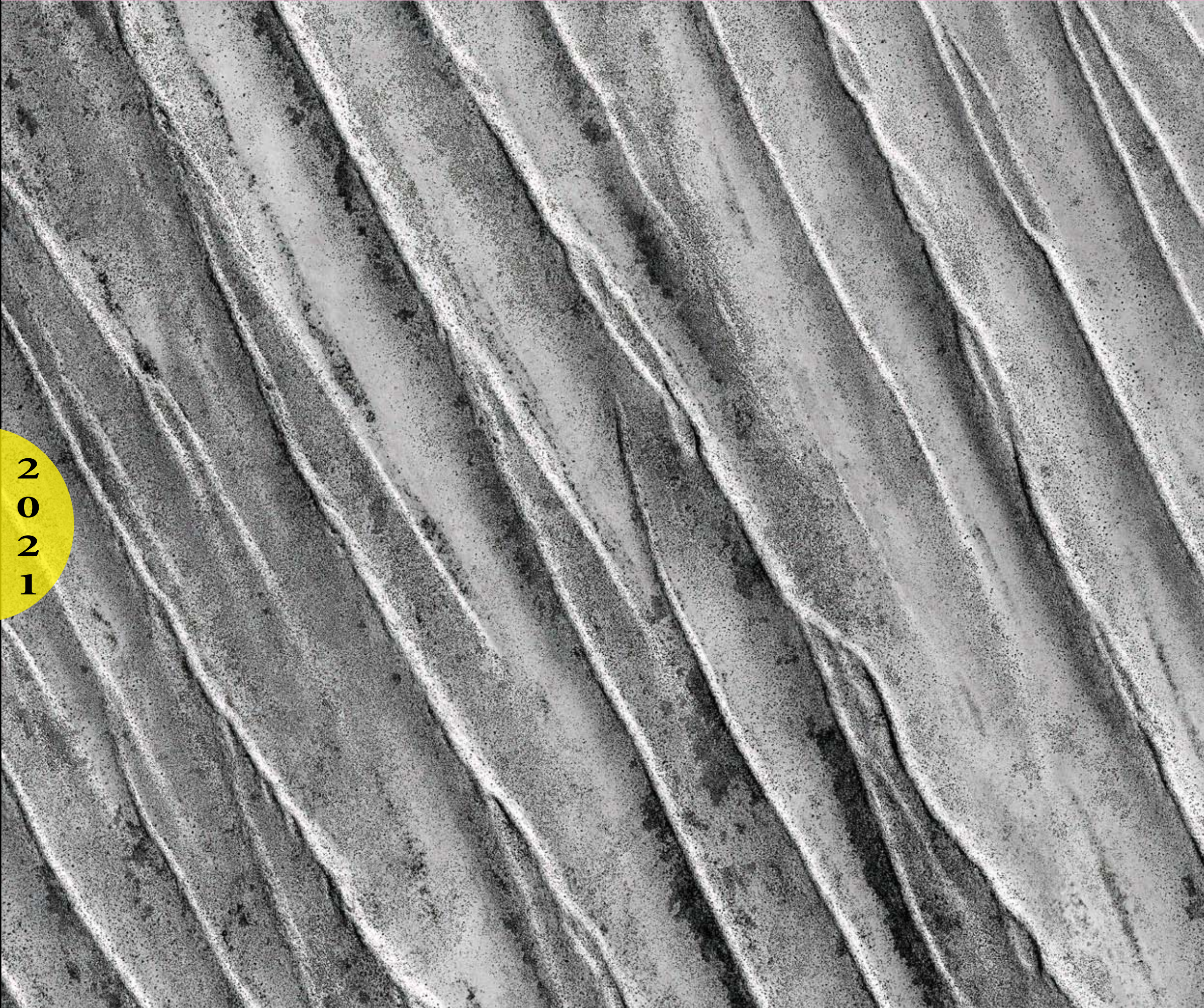
2021

Transverse dunes at An Nafud Desert in Saudi Arabia. Its sands are reddish which is originated from volcanic lava flows in Arabian Peninsula.

Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरूवार	Friday शुक्रवार	Saturday शनिवार
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

[illegible]

Arabian Desert is a vast desert wilderness in western Asia. It stretches from Yemen to the Persian Gulf and Oman to Jordan and Iraq. It occupies most of the Arabian Peninsula, with an area of 2,330,000 sq.km.



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Spectacular longitudinal dunes in Simpson Desert, Australia. They have developed by helicoidal wind flow of the prevailing south-southeastern winds, acting upon ancient alluvial plains.

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जुलाई July 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21 Bakri-id	22	23	24
25	26	27	28	29	30	31

June 2021

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

टिप्पणियाँ Notes

August 2021

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Great Victoria Desert is the largest desert in Australia and covers an area of 348,750 sq. km. It consists of many small sandhills, grassland plains, areas with surface pebbles and salt lakes.

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2021

Star dunes near Mingshashan city in eastern Taklamakan Desert, China. They have 3-4 arms which are radiating outward from the peaks and formed due to change in wind direction.

Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15 Independence Day	16	17	18	19 Muharram	20	21 Onam
22 Rakhsa Bandhan	23	24	25	26	27	28
29	30 Janmastami	31				

[illegible]

The Taklamakan Desert lies in southwest Xinjiang in northwest China with an area of 337,000 sq.km. It is bounded by the Kunlun Mountains to the south, the Pamir Mountains in the west, Tian Shan Mountain in the north and Gobi Desert to the east.

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Group of asymmetric barchan dunes in Morocco region of western Sahara, Africa. Unidirectional wind fields give rise to barchan dunes which are moving in the direction of wind from north to south.

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सितंबर September 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
			1	2	3	4
5	6	7	8	9	10 Vinayaka Chaturthi	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Augst 2021							टिप्पणियाँ Notes	October 2021						
S	M	T	W	T	F	S		S	M	T	W	T	F	S
1	2	3	4	5	6	7							1	2
8	9	10	11	12	13	14		3	4	5	6	7	8	9
15	16	17	18	19	20	21		10	11	12	13	14	15	16
22	23	24	25	26	27	28		17	18	19	20	21	22	23
29	30	31						24	25	26	27	28	29	30
								31						

Sahara Desert is the third largest desert of the world with an area of 9,200,000 sq.km. It is spread from Morocco in the west to Egypt in the east of the northern African Continent. It is the largest hot desert.

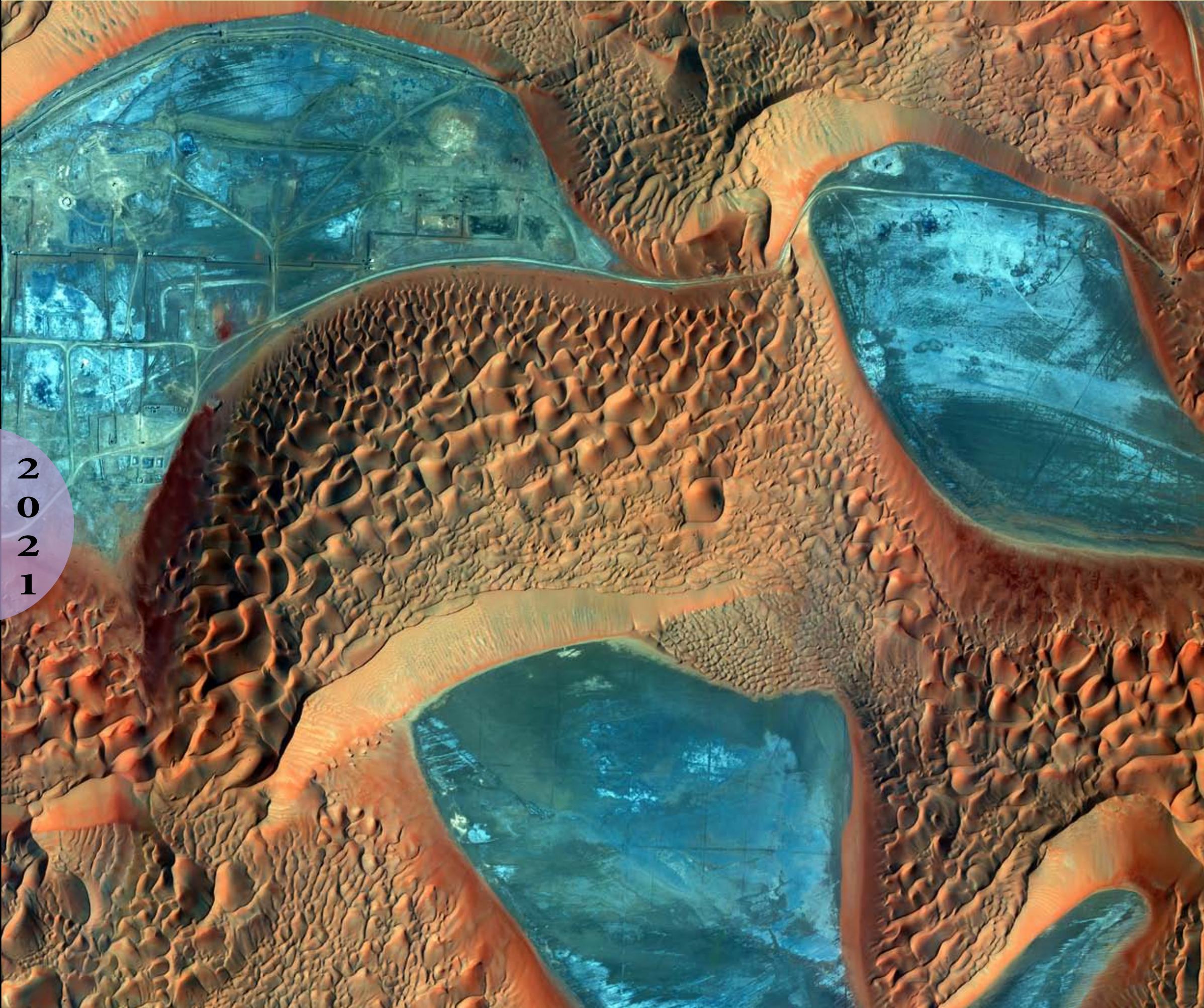
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Compound and complex mega-barchan dunes in northeastern margin of Rub Al Khali sand sea, Saudi Arabia. Dunes are surrounded by interdunal depressions with sabkha deposits with patches of gypcrete.

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अक्टूबर October 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
					1	2 Gandhi Jayanthi
3	4	5	6	7	8	9
10	11	12	13	14	15 Dussehra	16
17	18	19 Milad-un-nabi	20	21	22	23
24	25	26	27	28	29	30
31						

September 2021							टिप्पणियाँ Notes	November 2021						
S	M	T	W	T	F	S		S	M	T	W	T	F	S
			1	2	3	4			1	2	3	4	5	6
5	6	7	8	9	10	11		7	8	9	10	11	12	13
12	13	14	15	16	17	18		14	15	16	17	18	19	20
19	20	21	22	23	24	25		21	22	23	24	25	26	27
26	27	28	29	30				28	29	30				



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Star dunes near Ica city in Peru, South America. They have 3-4 arms which are radiating outward from the peaks and formed due to change in wind direction.

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नवंबर November 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
	1	2	3	4 Diwali	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19 Gurunanak's Birthday	20
21	22	23	24	25	26	27
28	29	30				

October 2021							टिप्पणियाँ Notes	December 2021							
S	M	T	W	T	F	S		S	M	T	W	T	F	S	
					1	2					1	2	3	4	
3	4	5	6	7	8	9			5	6	7	8	9	10	11
10	11	12	13	14	15	16			12	13	14	15	16	17	18
17	18	19	20	21	22	23			19	20	21	22	23	24	25
24	25	26	27	28	29	30		26	27	28	29	30	31		
31															

Atacama Desert is a desert plateau in South America, covering an area of 140,000 sq.km. It is comprised of an elongated strip of land (1,600 km) on the Pacific coast in the west of the Andes Mountains. Atacama Desert is essentially the driest desert in the world and received less precipitation.

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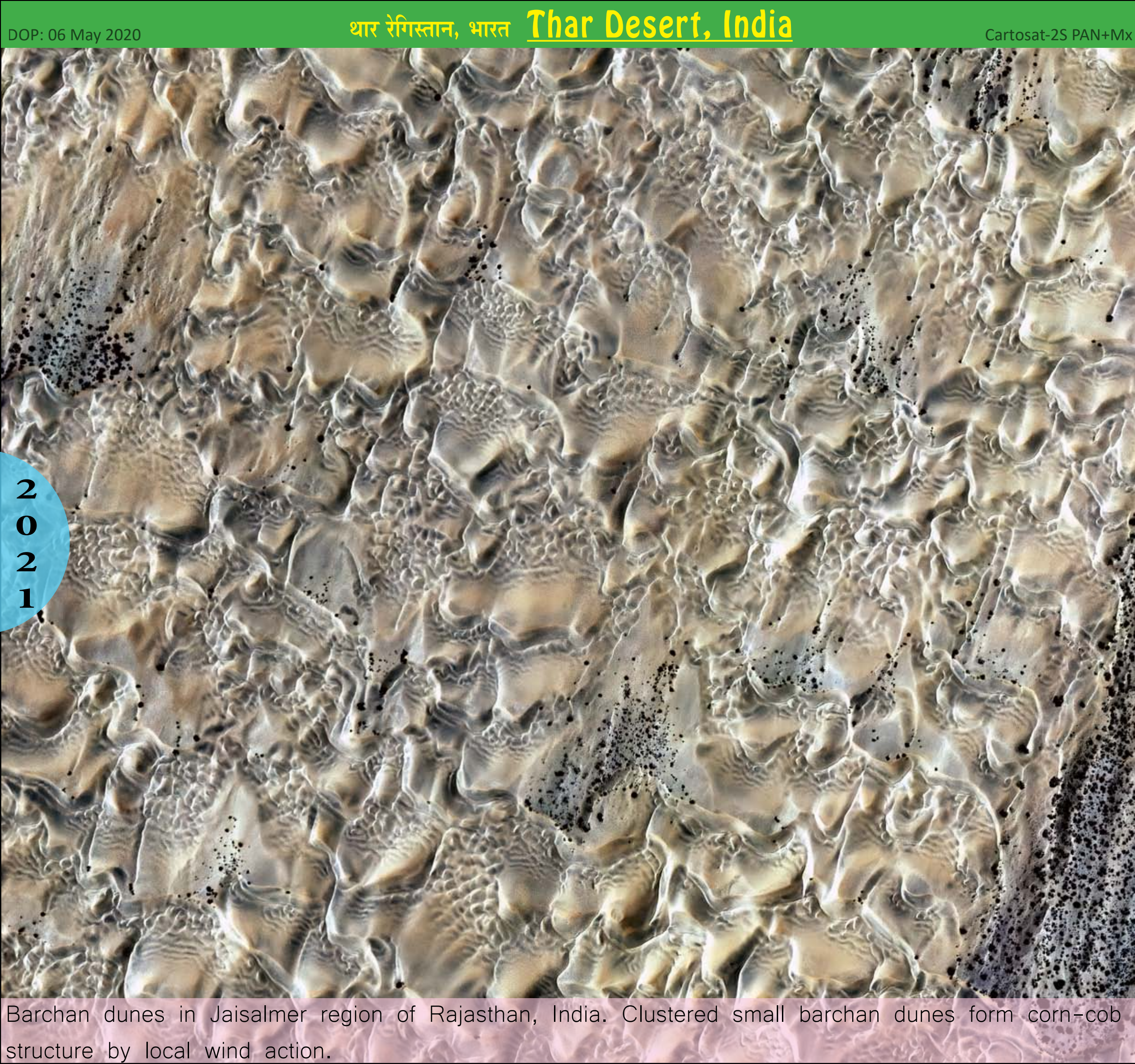
DOP: 06 May 2020

थार रेगिस्तान, भारत

Thar Desert, India

Cartosat-2S PAN+Mx

2021



Barchan dunes in Jaisalmer region of Rajasthan, India. Clustered small barchan dunes form corn-cob structure by local wind action.

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दिसंबर December 2021



Sunday रविवार	Monday सोमवार	Tuesday मंगलवार	Wednesday बुधवार	Thursday गुरुवार	Friday शुक्रवार	Saturday शनिवार
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25 Christmas
26	27	28	29	30	31	

December 2021							टिप्पणियाँ Notes	January 2022						
S	M	T	W	T	F	S		S	M	T	W	T	F	S
			1	2	3	4								1
5	6	7	8	9	10	11		2	3	4	5	6	7	8
12	13	14	15	16	17	18		9	10	11	12	13	14	15
19	20	21	22	23	24	25	16	17	18	19	20	21	22	
26	27	28	29	30	31		23	24	25	26	27	28	29	
							30	31						

Thar Desert, also known as the Great Indian Desert, is the 17th largest desert of the world and lies in the arid region in the northwestern part of the Indian subcontinent. It covers an area of 200,000 sq.km including India and Pakistan.

www.nrsc.gov.in

bhoonidhi.nrsc.gov.in

bhuvan.nrsc.gov.in

राष्ट्रीय सुदूर संवेदन केंद्र
National Remote Sensing Centre

भारतीय अंतरिक्ष अनुसंधान संगठन
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राष्ट्रीय सुदूर संवेदन केंद्र भारतीय अंतरिक्ष अनुसंधान संगठन

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2020	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
January				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
February							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
March	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
April				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
May	31					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
June		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
July				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
August	30	31					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
September			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
October					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
November	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
December			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		

S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	2022
30	31					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	January
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28						February
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			March
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	April
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					May
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			June
31					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	July
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				August
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		September
30	31					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	October
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				November
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	December