DIGITAL AND ONLINE RESOURCES

This is a selection of helpful and interesting resources for further exploration. If you find additional material, please contact the author.

**Examples of different dune morphological types**

Google Earth has many examples of dunes of different morphological types. The following provide selected examples of representative dune morphologies. Explore around the locations below to see spatial variations in dune morphology and the environmental context of the different dune types.

1. Barchans
	1. Western Sahara: [https://earth.google.com/web/@27.52301609,-13.09212794,4854.58485638a,0d,35y,2.2685h,0.0000t,0.0000r/data=ChAqDggBEgoyMDE4LTExLTAz?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4027.52301609%2C-13.09212794%2C4854.58485638a%2C0d%2C35y%2C2.2685h%2C0.0000t%2C0.0000r/data%3DChAqDggBEgoyMDE4LTExLTAz?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Southern Namib: [https://earth.google.com/web/@-26.90913859,15.3101389,182.93081154a,12724.16977445d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-26.90913859%2C15.3101389%2C182.93081154a%2C12724.16977445d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
2. Simple crescentic dunes
	1. Skeleton coast, Namibia: [https://earth.google.com/web/@-20.19475834,13.25029922,120.60499019a,7659.26132591d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-20.19475834%2C13.25029922%2C120.60499019a%2C7659.26132591d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. White Sands, New Mexico: [https://earth.google.com/web/@32.79438747,-106.28020335,1215.54430784a,3196.62186964d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4032.79438747%2C-106.28020335%2C1215.54430784a%2C3196.62186964d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
3. Compound crescentic dunes
	1. Namib Sand Sea: [https://earth.google.com/web/@-25.77138509,14.9153508,141.20702731a,7152.81705876d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-25.77138509%2C14.9153508%2C141.20702731a%2C7152.81705876d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Algodones Dunes, California: [https://earth.google.com/web/@32.85339331,-114.99407013,60.23771841a,4005.72775859d,35y,2.26849999h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4032.85339331%2C-114.99407013%2C60.23771841a%2C4005.72775859d%2C35y%2C2.26849999h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	3. Liwa, United Arab Emirates: [https://earth.google.com/web/@22.67371547,53.91164022,104.90284701a,27493.23720986d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4022.67371547%2C53.91164022%2C104.90284701a%2C27493.23720986d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
4. Simple linear dunes
	1. Seif type
		1. Erg Fachi Bilma: [https://earth.google.com/web/@17.70639526,13.33743019,462.14197135a,9107.75670857d,35y,2.26849999h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4017.70639526%2C13.33743019%2C462.14197135a%2C9107.75670857d%2C35y%2C2.26849999h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
		2. Rub’ al Khali, Saudi Arabia: [https://earth.google.com/web/@20.20214137,50.79517734,227.65652371a,16597.14440242d,35y,2.26849999h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4020.20214137%2C50.79517734%2C227.65652371a%2C16597.14440242d%2C35y%2C2.26849999h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Vegetated linear dunes
		1. Southwestern Kalahari, Namibia: [https://earth.google.com/web/@-24.82951515,19.09216974,1113.35453911a,16161.85351109d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-24.82951515%2C19.09216974%2C1113.35453911a%2C16161.85351109d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
		2. Simpson Desert, Australia: [https://earth.google.com/web/@-25.13242202,136.89662086,124.51223981a,24692.43830283d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-25.13242202%2C136.89662086%2C124.51223981a%2C24692.43830283d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
5. Compound linear dunes
	1. Namib Sand Sea: [https://earth.google.com/web/@-26.03159297,15.29512415,542.27298756a,8403.92384676d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-26.03159297%2C15.29512415%2C542.27298756a%2C8403.92384676d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Kumtagh Sand Sea, China: [https://earth.google.com/web/@40.28096351,92.41547375,956.03962322a,19340.45247947d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4040.28096351%2C92.41547375%2C956.03962322a%2C19340.45247947d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
6. Complex linear dunes
	1. Namib Sand Sea: [https://earth.google.com/web/@-24.3183003,15.07487182,493.5247968a,21499.81262217d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-24.3183003%2C15.07487182%2C493.5247968a%2C21499.81262217d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Rub’ al Khali United Arab Emirates: [https://earth.google.com/web/@23.35292284,55.06444037,111.43724428a,56015.8950721d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4023.35292284%2C55.06444037%2C111.43724428a%2C56015.8950721d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
7. Star dunes
	1. Grand Erg Oriental, Algeria: [https://earth.google.com/web/@31.11209626,8.53670681,229.55811469a,13582.41884919d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4031.11209626%2C8.53670681%2C229.55811469a%2C13582.41884919d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Grand Desierto, Mexico: [https://earth.google.com/web/@32.01630231,-114.32009015,74.47398861a,14397.57761456d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4032.01630231%2C-114.32009015%2C74.47398861a%2C14397.57761456d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	3. Namib Sand Sea: [https://earth.google.com/web/@-26.03802267,15.76304458,844.8330099a,15166.10379171d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-26.03802267%2C15.76304458%2C844.8330099a%2C15166.10379171d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
8. Parabolic dunes
	1. Thar Desert, India and Pakistan: [https://earth.google.com/web/@25.429827,70.5310036,128.69333432a,27594.85373892d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4025.429827%2C70.5310036%2C128.69333432a%2C27594.85373892d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. White Sands, New Mexico: [https://earth.google.com/web/@32.74373386,-106.26122886,1219.60969136a,14953.37273879d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4032.74373386%2C-106.26122886%2C1219.60969136a%2C14953.37273879d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	3. Winnemucca Dunes, Nevada: [https://earth.google.com/web/@41.08511418,-117.84223514,1284.10939904a,2944.94169539d,35y,2.26849999h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4041.08511418%2C-117.84223514%2C1284.10939904a%2C2944.94169539d%2C35y%2C2.26849999h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
9. Nebkhas
	1. Kuiseb Delta, Namib Sand Sea: [https://earth.google.com/web/@-23.11971815,14.47334956,9.45670339a,4029.67522509d,35y,352.44439544h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-23.11971815%2C14.47334956%2C9.45670339a%2C4029.67522509d%2C35y%2C352.44439544h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Quatar: [https://earth.google.com/web/@24.80033289,51.27595983,36.85299492a,684.25822027d,35y,0h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4024.80033289%2C51.27595983%2C36.85299492a%2C684.25822027d%2C35y%2C0h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
10. Climbing and falling dunes
	1. Mojave Desert: [https://earth.google.com/web/@35.71358208,-116.41717841,141.8205559a,14877.56233428d,35y,359.99999919h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4035.71358208%2C-116.41717841%2C141.8205559a%2C14877.56233428d%2C35y%2C359.99999919h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Cronese Mountains, California: [https://earth.google.com/web/@35.12246525,-116.30605413,552.77196735a,4084.91356325d,35y,2.2685h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4035.12246525%2C-116.30605413%2C552.77196735a%2C4084.91356325d%2C35y%2C2.2685h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
11. Lunettes
	1. Urwi Pan, Botswana: [https://earth.google.com/web/@-23.44749003,20.38294444,1259.50087869a,9734.31582496d,35y,-85.82888526h,44.48237556t,-0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-23.44749003%2C20.38294444%2C1259.50087869a%2C9734.31582496d%2C35y%2C-85.82888526h%2C44.48237556t%2C-0r?utm_source=earth7&utm_campaign=vine&hl=en)
	2. Chibnalwood Lakes and Lake Mungo, Australia: [https://earth.google.com/web/@-33.7718462,143.1183194,75.24672813a,16770.79913534d,35y,-0h,14.12485674t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%40-33.7718462%2C143.1183194%2C75.24672813a%2C16770.79913534d%2C35y%2C-0h%2C14.12485674t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)
	3. Carson Sink, Nevada: [https://earth.google.com/web/@39.98600087,-118.27348533,1192.51173388a,12069.59728437d,35y,0h,0t,0r?utm\_source=earth7&utm\_campaign=vine&hl=en](https://earth.google.com/web/%4039.98600087%2C-118.27348533%2C1192.51173388a%2C12069.59728437d%2C35y%2C0h%2C0t%2C0r?utm_source=earth7&utm_campaign=vine&hl=en)

Sand Transport Processes

Youtube Videos

Saltation and creep (field)

<https://youtu.be/BX7AZTUxwcA>

Saltation and creep (wind tunnel)

<https://www.youtube.com/watch?v=xc4bbbwUnNE>

Sand streamers

<https://www.youtube.com/watch?v=2n1SiIaHWok>

Slip Face Advance (field)

[https://youtu.be/41KcXVgmn0E](https://www.youtube.com/watch?v=41KcXVgmn0E&t=0s)

Sound-producing dunes

<https://www.youtube.com/watch?v=4yFaMsUawi4>

<https://www.youtube.com/watch?v=4mbypyJjqhk>

Animations of Dune processes

Nield, J.M., Wiggs, G.F.S., Baddock, M.C., Hipondoka, M.H.T., 2017. Coupling leeside grainfall to avalanche characteristics in aeolian dune dynamics. Geology 45, 271. <https://doi.org/10.1130/G38800.1>

Animation DR2 (2017071 Animation DR2.avi): Avalanche behavior (surface change of the

lee slope) for each of the 51 measurement periods, ordered by increasing mean wind speed of

scan period (i.e., not ordered in time). Surface change is indicated on left. Also shown

aligned with vertical scale is frequency histogram of derived grainfall flux distribution (QG; log scale on x axis) for each case. Wind speed (u) and 95th percentile distributions of

grainfall length (GL95) are indicated on the bottom right for each measurement period. See

Fig. 3 for examples of avalanche behavior under conditions of (A) low, (B) intermediate and

(C) high mean wind speeds. File size is ~2 MB.

Open Access Materials

Gao, X., Narteau, C., Rozier, O., Courrech du Pont, S., 2015. Phase diagrams of dune shape and orientation depending on sand availability. Scientific Reports 5:14677. doi: 10.1038/srep14677; <https://www.nature.com/articles/srep14677>

<https://www.nature.com/articles/srep14677#MOESM2>

Movie S1 – Development of dunes in the bed instability mode

Movie S2 – Development of dunes in the fingering mode

Movie S3 – Break up of fingering mode dunes into asymmetric barchans

Move S4 – Development of stable fingering mode dunes

Gunn, A., Casasanta, G., Liberto, L.D., Falcini, F., Lancaster, N., Jerolmack, D.J., 2022. What sets aeolian dune height? Nature Communications 13, 2401.

<https://doi.org/10.1038/s41467-022-30031-1>.

Supplementary Movie 1: [https://static-content.springer.com/esm/art%3A10.1038%2Fs41467-022-30031-1/MediaObjects/41467\_2022\_30031\_MOESM4\_ESM.mp4](https://static-content.springer.com/esm/art%3A10.1038/s41467-022-30031-1/MediaObjects/41467_2022_30031_MOESM4_ESM.mp4)

This time-lapse movie shows the results of six numerical simulations of dune development in conditions of low and high sand supply (rows: low, top; high, bottom.) and sand flux directionality (columns: 1, left; 2, center; 5, right). Experiments are shown to the same scale. To ensure form can be seen during coarsening, the color bar is unique for each experiment at each timestep: the minimum and maximum elevations (i.e. the color bar limits) are written in the bottom corners of each frame to the nearest meter. In the top right, the timestep is written to the nearest 1 decimal place in years. White space within the frame is non-erodible substate.