This data article provides a precise level data on alluvial fans of the western border of Lut desert, a unique location on the Earth, known as one of the hottest spot on the Earth. This data is essential for morphotectonic investigations and is valuable in the field of tectonic and geomorphology studies. It helps to evaluate the region from the viewpoint of tectonic activity by considering the dynamics of alluvial fans, climate and tectonic setting. The data which are presented for 68 quaternary alluvial fans, is taken by processing of remotely sensed Landsat satellite data, photogeology of aerial photographs, measuring on topographic maps and controlled by field checking. This data is useful for defining of a morphotectonic model of this limited access region considering the uplift of the source area along Nayband fault, as the basin–margin fault, respect to the base level.

© 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).
How data was acquired: Survey, Topographic maps, Photogeology, Field checking.

Data format: Raw, analyzed.

Experimental factors: The geometry of alluvial fans.

Experimental features: The geometric characteristics of Alluvial fans were measured.

Data source location: Shahdad, Iran. Latitude: 57°33' to 57°42' N & Longitude: 30°24' to 30°55' E.

Data accessibility: Data is available with this article.

Data source location: Shahdad, Iran. Latitude: 57°33' to 57°42' N & Longitude: 30°24' to 30°55' E.

Data accessibility: Data is available with this article.

Related research article: N/A

Value of the data

- The data presents a morphotectonic outlook about the activity of Nayband Fault.
- It helps to explain the impact of Nayband fault on the tectonic activity of the Western Lut.
- Data can be applied for quantitative analysis in the field of tectonic geomorphology and morphotectonics.
- Other researchers may use the data for their research work and further investigation.

1. Data

The data presented here describe the morphometric characteristic of 68 alluvial fans of western Lut desert. Data is given in table form. The data is prepared based on fieldwork in a limited access region and laboratory analysis.

2. Experimental design, materials and methods

Tectonic setting and climatic fluctuations could fundamentally control morphometrics of alluvial fans, the prominent geomorphological landforms in mountain fronts, by uplifting and maintaining the topography, controlling the sediment supply and duration of deposition through increasing gradients of drainages [1–10] especially in arid zones where little changes in precipitation can effectively affect stream discharge [11]. These landforms that could be served as important groundwater reservoirs [12,13] made out of loose rock materials that are formed at the mountain fronts where drainages reach the plain. In a mountain range, some of the alluvial fans show different characteristics which are important as they present the history of the changes that have taken place in the region over millennia. They give evidence of tectonic activities and the past climate that had formed the morphology of these landforms and the challenge is to understand the relative impact of each.

In order to achieve this goal, each of the alluvial fans was first mapped through satellite studies and photogeology. Subsequently, their position and boundary were controlled and finalized in the field. Thus, some characteristics such as the environment, area, length and width of alluvial fans were calculated by using the mentioned checked map. To calculate other parameters, such as minimum elevation, average elevation, maximum elevation, elevation gain, elevation loss, maximum slope and the average slope of alluvial fans, after determination of the location of the points on a topographic map, the elevation of them was controlled by GPS on the field.

Iran is considered to be tectonically active regarding its geological situation and features [14–19] and this paper has tried to present data valuable for examining the morphotectonic imprints which are discernible in the morphology of the fans in the southern part of Nayband fault, a right lateral strike slip fault in Central Iran, that forms the western border of Lut desert. Due to the close distance of these landforms to one of the area wherein five of the seven years was detected as the hottest spot on the Earth, having a surface temperature above 70 °C [20], access to them is not easy and the present data is also valuable at this point of view.
Table 1
Geometric data of alluvial fans. N: Alluvial fan number, L: Length of the Alluvial fan in meters, W: Width of the Alluvial fan in meters, P: Perimeter of the Alluvial fan in meters, A: Area of the Alluvial fan in square meters.

| N  | L    | W    | P    | A       |
|----|------|------|------|---------|
| 1  | 7350 | 1270 | 16.173 | 6152318 |
| 2  | 1770 | 331  | 3869  | 393789  |
| 3  | 2530 | 354  | 5506  | 617923  |
| 4  | 7440 | 2130 | 18052 | 4226448 |
| 5  | 6150 | 866  | 20889 | 9822912 |
| 6  | 6610 | 769  | 20982 | 7624863 |
| 7  | 2660 | 867  | 20932 | 7450879 |
| 8  | 9840 | 714  | 6017  | 543856  |
| 9  | 9720 | 171  | 14010 | 6066108 |
| 10 | 2760 | 1320 | 10827 | 5067842 |
| 11 | 4560 | 1570 | 9925  | 2864439 |
| 12 | 4530 | 758  | 10942 | 3378264 |
| 13 | 2240 | 237  | 5055  | 4738211 |
| 14 | 4640 | 691  | 10299 | 2601741 |
| 15 | 1580 | 244  | 3366  | 265993  |
| 16 | 1590 | 148  | 3407  | 161264  |
| 17 | 4690 | 741  | 10840 | 3637627 |
| 18 | 4700 | 693  | 10942 | 3378264 |
| 19 | 4950 | 553  | 10584 | 2263571 |
| 20 | 5240 | 295  | 11058 | 1213185 |
| 21 | 7240 | 147  | 1809  | 79526   |
| 22 | 1610 | 357  | 3548  | 391794  |
| 23 | 1230 | 354  | 3282  | 456287  |
| 24 | 5380 | 789  | 11469 | 2475554 |
| 25 | 1540 | 168  | 3403  | 179170  |
| 26 | 3930 | 205  | 8838  | 107496  |
| 27 | 2500 | 315  | 6169  | 515950  |
| 28 | 4110 | 872  | 10389 | 3517202 |
| 29 | 343  | 414  | 7646  | 1290645 |
| 30 | 3190 | 636  | 7385  | 1448130 |
| 31 | 2460 | 244  | 6470  | 731873  |
| 32 | 1890 | 488  | 4617  | 756267  |
| 33 | 1670 | 160  | 4270  | 311460  |
| 34 | 594  | 146  | 1688  | 83169   |
| 35 | 5580 | 422  | 12044 | 1887376 |
| 36 | 766  | 160  | 2189  | 137841  |
| 37 | 8270 | 5800 | 24279 | 36799188 |
| 38 | 7620 | 476  | 16203 | 3781584 |
| 39 | 6710 | 1670 | 16233 | 815812  |
| 40 | 2400 | 985  | 7047  | 1903126 |
| 41 | 5650 | 886  | 13948 | 3961240 |
| 42 | 934  | 157  | 2378  | 151441  |
| 43 | 526  | 217  | 1776  | 98149   |
| 44 | 370  | 178  | 1374  | 54221   |
| 45 | 2210 | 776  | 6327  | 1533558 |
| 46 | 4540 | 772  | 10181 | 2466201 |
| 47 | 3490 | 1300 | 9425  | 3807583 |
| 48 | 2230 | 659  | 5658  | 1186220 |
| 49 | 1720 | 647  | 4723  | 936146  |
| 50 | 4120 | 1500 | 12898 | 5193159 |
| 51 | 3090 | 926  | 7661  | 2156896 |
| 52 | 2440 | 1500 | 7042  | 2927413 |
| 53 | 1490 | 491  | 3775  | 663634  |
| 54 | 831  | 645  | 2906  | 431537  |
| 55 | 1460 | 1550 | 6746  | 2090894 |
| 56 | 1100 | 902  | 4059  | 789848  |
| 57 | 2420 | 22600 | 92178 | 486826249 |
| 58 | 4210 | 976  | 10022 | 2992619 |
| 59 | 2260 | 1280 | 5685  | 1955055 |
Table 1 (continued)

| N  | L    | W    | P    | A    |
|----|------|------|------|------|
| 60 | 8820 | 1770 | 20821| 13401104|
| 61 | 1440 | 3030 | 32971| 36204138|
| 62 | 3740 | 867  | 9832 | 2738026|
| 63 | 2700 | 745  | 6501 | 1245319|
| 64 | 4340 | 1140 | 2738026|
| 65 | 1690 | 8760 | 45684| 128145633|
| 66 | 3120 | 1240 | 7910 | 3175471|
| 67 | 5730 | 1190 | 13498| 4872803|
| 68 | 956  | 7130 | 66538| 172077148|

Table 2

Alluvial fans elevation data. N: Alluvial fan number, Em: Minimum elevation of alluvial fan in meters, Ev: Average elevation of alluvial fan in meters, Ex: Maximum elevation of alluvial fan in meters, Eg: Gained elevation of alluvial fan in meters, Es: Lost elevation of alluvial fan in meters, Sx: Maximum slope of alluvial fan in percent, Sv: Average slope of alluvial fan in percent.

| N  | Em  | Ev  | Ex  | Eg  | Es  | Sx  | Sv  |
|----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 282 | 366 | 475 | 0.07| -193| -4.6| -2.7|
| 2  | 409 | 436 | 468 | 0   | -594| -4.6| -3.4|
| 3  | 385 | 425 | 468 | 0.79| -83 | -6.5| -3.2|
| 4  | 278 | 368 | 480 | 0.58| -203| -5.6| -2.7|
| 5  | 345 | 442 | 582 | 0   | -237| -12.6| -3.9|
| 6  | 353 | 457 | 614 | 0.04| -261| -12  | -4  |
| 7  | 322 | 532 | 941 | 2.97| -622| -6.9 | -2.4|
| 8  | 280 | 396 | 592 | 0   | -312| -10.2| -3.2|
| 9  | 279 | 400 | 579 | 0.88| -300| -8.4 | -3.1|
| 10 | 456 | 519 | 608 | 0   | -153| -16.5| -5.5|
| 11 | 426 | 518 | 680 | 0   | -253| -32.2| -5.6|
| 12 | 427 | 516 | 677 | 0   | -249| -42  | -5.5|
| 13 | 507 | 576 | 685 | 0   | -178| -29.9| -7.9|
| 14 | 423 | 517 | 688 | 0.21| -266| -31.8| -5.7|
| 15 | 546 | 605 | 692 | 0   | -146| -26.6| -9.3|
| 16 | 532 | 584 | 655 | 0   | -123| -13.6| -7.8|
| 17 | 415 | 517 | 696 | 0   | -280| -24.9| -6  |
| 18 | 399 | 483 | 618 | 0.32| -220| 17.2 | 4.7 |
| 19 | 389 | 477 | 652 | 0.57| -264| 1.4  | 1.1 |
| 20 | 381 | 469 | 623 | 0   | -242| -28.5| -4.8|
| 21 | 565 | 600 | 667 | 0   | -102| -33.8| -14 |
| 22 | 518 | 575 | 664 | 0   | -145| -30.2| -9  |
| 23 | 546 | 593 | 674 | 0   | -128| -29.9| -10.3|
| 24 | 376 | 466 | 616 | 0   | -240| -9.8  | -4.5|
| 25 | 496 | 543 | 600 | 0   | -104| -10.6| -6.7|
| 26 | 395 | 470 | 575 | 0   | -180| -9.4  | -4.6|
| 27 | 473 | 547 | 642 | 0   | -169| -11  | -6.8|
| 28 | 420 | 520 | 687 | 0   | -287| -23.7| -6.5|
| 29 | 450 | 539 | 702 | 0   | -253| -37.2| -7.3|
| 30 | 458 | 544 | 681 | 0   | -223| -23.6| -7  |
| 31 | 491 | 563 | 678 | 0   | -187| -24.5| -7.6|
| 32 | 523 | 585 | 680 | 0   | -157| -23.1| -8.3|
| 33 | 539 | 594 | 678 | 0   | -139| -18.1| -8.3|
| 34 | 602 | 630 | 673 | 0   | -713| -24.8| -12|
| 35 | 376 | 471 | 646 | 0   | -268| -13.8| -4.8|
| 36 | 584 | 620 | 671 | 0.05| -875| -18  | -11.4|
| 37 | 360 | 462 | 622 | 0.15| -283| -6.9  | -3.2|
| 38 | 372 | 471 | 663 | 0.42| -291| -16.4| -3.8|
| 39 | 384 | 482 | 647 | 0   | -263| -12.1| -3.9|
| 40 | 503 | 562 | 622 | 0   | -119| -6.8  | -5  |
The morphometric attributes of alluvial fans which are presented here (Tables 1 and 2 and Figs. 1–5) could help to understand the tectonic activity stage that has governed the morphology of the features. Thus, the present data is valuable to analyse the morphotectonic control over the alluvial fan morphology by doing a comparative analysis of these fans with respect to morphological attributes.

| N  | Em | Ev | Ex | Eg  | Es  | Sx | Sv |
|----|----|----|----|-----|-----|----|----|
| 41 | 407| 494| 639| 1.81| –234| –19.8| –4.2|
| 42 | 547| 584| 671| 0   | –124| –40.7| –13 |
| 43 | 560| 587| 639| 0   | –79.6| –36.4| –15 |
| 44 | 580| 592| 644| 2.3 | –652| –46.2| –19.5|
| 45 | 503| 559| 644| 0   | –141| –23.9| –6.4 |
| 46 | 419| 505| 618| 0   | –199| –10.4| –4.4 |
| 47 | 456| 541| 651| 0   | –195| –19.8| –5.6 |
| 48 | 496| 571| 686| 0.07| –190| –39.8| –8.5 |
| 49 | 534| 591| 684| 0.02| –150| –26.6| –8.7 |
| 50 | 460| 538| 704| 0.36| –244| –55.4| –5.9 |
| 51 | 508| 580| 725| 0   | –216| –37.3| –6.9 |
| 52 | 533| 592| 690| 0   | –156| –27.5| –6.4 |
| 53 | 580| 626| 709| 0   | –129| –32.8| –8.6 |
| 54 | 599| 632| 690| 0   | –91 | –28.2| –10.9|
| 55 | 592| 633| 697| 0   | –105| –27.7| –7.1 |
| 56 | 639| 666| 712| 0   | –72.9| –20.5| –6.5 |
| 57 | 302| 426| 686| 3.33| –385| –18.5| –1.7 |
| 58 | 552| 613| 712| 0.2 | –160| –13.4| –3.8 |
| 59 | 598| 649| 787| 0   | –189| –34.9| –8.3 |
| 60 | 433| 552| 731| 0   | –297| –7.3 | –3.4 |
| 61 | 363| 486| 773| 1.87| –411| –16.6| –3.3 |
| 62 | 501| 578| 728| 0   | –227| –19.1| –6.1 |
| 63 | 536| 624| 851| 0   | –315| –42.3| –11.5|
| 64 | 489| 558| 709| 0.7 | –221| –30.2| –5.2 |
| 65 | 349| 461| 695| 1.44| –347| –8.4 | –2.1 |
| 66 | 523| 581| 678| 0   | –154| –17.7| –4.9 |
| 67 | 501| 605| 756| 0.16| –255| –12.4| –4.5 |
| 68 | 286| 401| 628| 0   | –342| –20.9| –3.6 |

Fig. 1. Alluvial fans average slope. Horizontal axis shows the number of the alluvial fan and vertical axis shows the measured average slope in percentage for each of the alluvial fans.
Fig. 2. Average elevation of Alluvial fans in western border of Lut desert. Horizontal axis shows the number of the alluvial fan and vertical axis shows the average elevation in meter of each of the alluvial fans from the sea level.

Fig. 3. Alluvial fans elevation loss. The number of alluvial fans is shown in the horizontal axis while the vertical axis shows the elevation loss in meter for each of the alluvial fans.

Fig. 4. Maximum slope of alluvial fans. The number of alluvial fans is shown in the horizontal axis while the vertical axis shows the maximum slope in percent for each of the alluvial fans.
Acknowledgements

We are grateful to the Department of Geology, Shahid Bahonar University of Kerman for providing some of the necessary facilities and financial support.

Funding sources

This work is part of MSc thesis of Farzaneh Hashemi and was funded by Shahid Bahonar University of Kerman, Iran.

Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.11.017.

References

[1] S. Ayaz, M. Biswas, M.K. Dhali, Morphotectonic analysis of alluvial fan dynamics: comparative study in spatio-temporal scale of Himalayan foothill, India, Arab. J. Geosci. 11 (2) (2018) 41.
[2] T.C. Blair, J.C. McPherson, Alluvial fans and their natural distinction from rivers based on morphology, hydraulic processes, sedimentary processes, and facies assemblages, J. Sediment. Res. 64 (3) (1994) 450–489.
[3] P.K. Goswami, C.C. Pant, S. Pandey, Tectonic controls on the geomorphic evolution of alluvial fans in the Piedmont Zone of Ganga Plain, Uttarakhand, India, J. Earth Syst. Sci. 118 (3) (2009) 245–259.
[4] A.M. Harvey, Differential effects of base-level, tectonic setting and climatic change on Quaternary alluvial fans in the northern Great Basin, Nevada, USA, Geo. Soc. Lond., Spec. Publ. 251 (1) (2005) 117–131.
[5] S.J. Jones, Tectonic controls on drainage evolution and development of terminal alluvial fans, southern Pyrenees, Spain. Terra Nova 16 (3) (2004) 121–127.
[6] S.J. Jones, N. Arzani, M.B. Allen, Tectonic and climatic controls on fan systems: the Kohrud mountain belt, Central Iran, Sediment. Geol. 302 (2014) 29–43.
[7] A. Fadaie Kermani, R. Derakhshani, S.S. Bafti, Data on morphotectonic indices of Dashtekhak district, Iran, Data in Brief. 14 (2017) 782–788.
[8] A. Singh, B. Parkash, R. Mohindra, J. Thomas, A. Singhvi, Quaternary alluvial fan sedimentation in the Dehradun valley piggyback basin, NW Himalaya: tectonic and palaeoclimatic implications, Basin Res. 13 (4) (2001) 449–471.
[9] N. Suresh, T.N. Bagati, R. Kumar, V.C. Thakur, Evolution of Quaternary alluvial fans and terraces in the intramontane Pinjaur Dun, Sub-Himalaya, NW India: interaction between tectonics and climate change, Sedimentology 54 (4) (2007) 809–833.
[10] C. Viseras, M.L. Galvache, J.M. Soria, J. Fernández, Differential features of alluvial fans controlled by tectonic or eustatic accommodation space: Examples from the Betic Cordillera, Spain, Geomorphology 50 (1-3) (2003) 181–202.
[11] M. Vázquez-Urbez, C. Arenas, G. Pardo, J. Pérez-Rivarés, The effect of drainage reorganization and climate on the sedimentologic evolution of intermontane lake systems: the final fill stage of the Tertiary Ebro Basin (Spain), J. Sediment. Res. 83 (8) (2013) 562–590.

[12] A. Abbasnejad, B. Abbasnejad, R. Derakhshani, A.H. Sarapardeh, Qanat hazard in Iranian urban areas: explanation and remedies, Environ. Earth Sci. 75 (19) (2016) 1306.

[13] J. Rahnama-Rad, M.Y. Bavali, R. Derakhshani, Optimization of hydraulic parameters of Iranshahr alluvial aquifer, Am. J. Environ. Sci. 6 (6) (2010) 477–483.

[14] R. Derakhshani, S.S. Eslami, A new viewpoint for seismotectonic zoning, Am. J. Environ. Sci. 7 (3) (2011) 212–218.

[15] R. Derakhshani, G. Farhoudi, Existence of the Oman line in the empty quarter of Saudi Arabia and its continuation in the Red Sea, J. Appl. Sci. 5 (2005) 745–752.

[16] A. Mirzaie, S.S. Bafti, R. Derakhshani, Fault control on Cu mineralization in the Kerman porphyry copper belt, SE Iran: a fractal analysis, Ore Geol. Rev. 71 (2015) 237–247.

[17] R. Rahbar, S.S. Bafti, R. Derakhshani, Investigation of the tectonic activity of Bazargan Mountain in Iran, Sustain. Dev. Mt. Territ. 9 (4) (2017) 380–386.

[18] J. Rahnama Rad, R. Derakhshani, G. Farhoudi, H. Ghorbani, Basement faults and salt plug emplacement in the araban platform in Southern Iran, J. Appl. Sci. 8 (18) (2008) 3235–3241.

[19] H. Amirihanza, S. Shafigh, R. Derakhshani, S. Khoejastehfar, Controls on Cu mineralization in central part of the Kerman porphyry copper belt, SE Iran: constraints from structural and spatial pattern analysis, J. Struct. Geol. 116 (2018) 159–177.

[20] D.J. Mildrexler, M. Zhao, S.W. Running, Satellite finds highest land skin temperatures on earth, Bull. Am. Meteorol. Soc. 92 (7) (2011) 855–860.