

Interactive comment on “Trail formation by ice-shoved “sailing stones” observed at Racetrack Playa, Death Valley National Park” by R. D. Lorenz et al.

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Received and published: 15 September 2014

General comments:

(1) This manuscript details recent observation of rock motion at Racetrack Playa and postulates a mechanism for motion and track formation. The authors have shown great persistence in capturing images and videos of the actual motion of track-forming rocks, and their treatment of their findings is detailed and rigorous. The text is very pithy (in some cases maybe too much so) and readable.

(2) Some key factors of the competing hypotheses of formation are not made clear. Specifically, how does rock velocity of 1m/s indicate probable wind movement? To

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what does “congruence” refer to in “congruence of many trails (compatibility? Agreement in terms of direction? Length? Width?). This last becomes more clear in the “Observations” section, but isn’t when it is first introduced. A short “because wind causes x (reference)” clause would likely be enough to clarify meaning.

(3) Related to this, a clear statement up-front (in the abstract or at the very end of the Introduction section that says, “ We observed (or will show) that the motion of rocks is due to wind driving ice blocks that (push? Drag?) the (embedded?) rocks.” However, this last indicates that it was not immediately clear whether tracks could be made by rocks embedded in ice (p. 1009, line 15; p. 1010, line 6) or through being bulldozed (p. 1008, line 10) or both. This is explored in p. 1010, lines 6-12, but a clear statement early in the manuscript saying, “we think it’s this, modified by that” would avoid confusion regarding the mechanism the authors have observed.

(4) Do the authors see any correlation between cobble morphology and movement? This is not a suggestion of additional required work for this manuscript if it has not been conducted, but a question of whether it has been considered. Observing actual movement of cobbles would not be required to determine this, as measurements could be conducted on any rock with a track.

Specific comments:

(1) Fig. 6: It is not clear what the contrast-stretched images are meant to show. The figure caption states that 4 rocks have changed position, but I can’t glean from the images which these are. How is the image stretched, and what does the stretching highlight? For example, does the stretch increase contrast in shadow changes, or temperature, or some measure of reflectance that would indicate movement? I assume the time differential from Dec. 20 to Dec. 21 is to normalize the lighting conditions for time of day?

(2) Fig. 7: Because of the differences in viewing angle and scale between the two images, it is difficult to see what I assume is showing the visible differences along the

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shore that indicate ice block rotation. I'm guessing this was the best pair of images to demonstrate this motion, but perhaps annotating the image with motion arrows or indicating areas where changes along the shore are clear, would help clarify things. Incidentally, on p. 1009, line 11, I love the parenthetical statement here – it shows true planetary thinking (clockwise as seen from above, as opposed to the point of view of being under the ice).

Technical corrections:

(1) p. 1008, line 8: Rock should be capitalized

(2) Fig. 3 caption: under (c), should be “and is seen here to have moved. . . .”

(3) I assume LT stands for “local time”?

(4) p. 1009, line 7: apparent is misspelled.

(5) p. 1010, line 19: Last sentence in the paragraph says “About ~. . . .” You can use one or the other, no need for both.

(6) In general the authors make frequent use of parenthetical statements and statements set off by hyphens to add specificity to a statement. This is a stylistic choice, of course, but it can be jarring in some cases. For particularly long sentences, it can obscure meaning. Consider going through the text and cutting the more lengthy examples. Two of these are: –p. 1010, line 10: This sentence has two parenthetical statements, one of which has essentially another parenthetical statement (e.g. . . .). It might be clearer if the Lorenz et al. reference is somehow included in the one parenthetical statement rather than chopping up the sentence multiple times. –p. 1010, line 13 and on: This is a six-line sentence with one clause set apart by hyphens and two parenthetical asides, not including references. Can it be cut and made into a few shorter sentences?

(7) p. 1011, line 3: Authors are referred to by initials, whereas previously last names were used.

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(8) Figures need scale bars.

Interactive comment on Earth Surf. Dynam. Discuss., 2, 1005, 2014.

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