There’s an app for that… Testing geologic smartphone apps against the Brunton Pocket Transit

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Abstract

In geological mapping, attitudes of rock strata are described by measuring strike and dip. In the field, the locations and attitudes of rock strata are measured difficult, even dangerous. To this end, smartphone apps have been developed that take strike and dip measurements quickly and easily, and even help them using GPS with the option to include photos or drawings. This has presented a dilemma among geologists as to their usability, especially regarding the quality of the measurement. It is expected that a conventional magnetic compass will be more precise, at least as accurate, but there is no argument for being able to take measurements quickly and easily, especially in physically challenging situations. Thus the app’s need the phone’s accelerometer and magnetometer to orient itself, the choice of app should not be hindered by the phone model. For this test, we determined whether the app is able to provide strike and dip measurements accurately and reliably. We determined whether the app is able to provide strike and dip measurements accurately and reliably.

Introduction

In geological mapping, attitudes of rock strata are described by measuring strike and dip. In the field, the locations and attitudes of rock strata are measured difficult, even dangerous. To this end, smartphone apps have been developed that take strike and dip measurements quickly and easily, and even help them using GPS with the option to include photos or drawings. This has presented a dilemma among geologists as to their usability, especially regarding the quality of the measurement. It is expected that a conventional magnetic compass will be more precise, at least as accurate, but there is no argument for being able to take measurements quickly and easily, especially in physically challenging situations. Thus the app needs the phone’s accelerometer and magnetometer to orient itself, the choice of app should not be hindered by the phone’s model. For this test, we determined whether the app is able to provide strike and dip measurements accurately and reliably. We determined whether the app is able to provide strike and dip measurements accurately and reliably.

Methods

- **Smartphone app** - Strike & Dip app simply reads phone’s accelerometer, acclerometer, and GPS.
- **Testing** - Testing was performed over five minutes. Left of black vertical line is data taken right side up, the LG G4, and to a lesser degree, the LG L. Figure 1.

Results

<table>
<thead>
<tr>
<th>Device</th>
<th>Measurements</th>
<th>Mean Strike</th>
<th>Mean Dip</th>
<th>CV Strike</th>
<th>CV Dip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunton</td>
<td>92</td>
<td>0.77</td>
<td>1.86</td>
<td>5.73</td>
<td>8.94</td>
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<td>LG V10</td>
<td>48</td>
<td>0.81</td>
<td>1.79</td>
<td>5.53</td>
<td>8.75</td>
</tr>
<tr>
<td>LG G4</td>
<td>48</td>
<td>0.81</td>
<td>1.79</td>
<td>5.53</td>
<td>8.75</td>
</tr>
<tr>
<td>iPhone 6</td>
<td>48</td>
<td>0.81</td>
<td>1.79</td>
<td>5.53</td>
<td>8.75</td>
</tr>
<tr>
<td>iPad v.9.3.5</td>
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<td>0.81</td>
<td>1.79</td>
<td>5.53</td>
<td>8.75</td>
</tr>
</tbody>
</table>

Discussion

- **Methods** - The Brunton Pocket Transit clearly measures the highest precision when used correctly (Fig. 1).
- **Results** - For tests of precision tests arranged by device (Fig. 1), it suggests that the measurement of the device likely affects the quality of the strike measurement. For example, the LG V10, in the upright position is relatively consistent, whereas strike up, if the product is a mobile device. The iPhone 6, on the other hand, performed better when upside down, going significantly below the Brunton’s criteria.
- **Implications** - It is probable that the electronic devices’ orientation affects the reading they give. These results may be similar to or greater than observed devices measured.

Conclusion

With this in mind, further considerations such as ANOVA would help elucidate the performance of the devices. Further testing of these devices versus the Brunton compass and other testing by ANOVA may be necessary.

Acknowledgements

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References


Appendix

- Figure 1. Histogram of precision tests arranged by orientation, with basic parametric statistics in boxes at right. All Brunton compass measurements are compared against right side up (A) and upside down (B) orientation results for individual devices. All Brunton compass measurements are compared against right side up (A) and upside down (B) orientation results for individual devices.