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Use of the iPhone as a geological field tool: Practical benefits and technical limitations.

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Historically, field measurements of the orientation of geological structures ('dip and strike') have been taken with rather simple, mechanical instruments, largely unchanged since the science began, and plotted manually on a base map. While robust, these instruments require some skill to use, and are relatively imprecise.

Specialised, electronic variants of the compass clinometers are expensive and have not been widely adopted. However, mainstream, multifunctional consumer electronic devices have now evolved to the point where they may be adaptable as electronic compass clinometers. The 3G iPhone is one such device, as it incorporates a GPS and accelerometers which can be used to measure the tilt of the device.

The critical limitation of the iPhone for this application is the lack of an inbuilt compass. Thus, the device cannot independently generate a strike measurement. A hybrid method, using a conventional compass for strike, and the iPhone to measure position, dip and provide an accurate horizontal, can be used.

In a series of field tests over different geological structures, the relative speed and accuracy of a conventional compass clinometers and the iPhone compass hybrid are demonstrated and compared. The relative merits of each tool are discussed. We also consider whether the potentially greater accuracy of digital field tools is of actual benefit to the interpretation of geological structures .