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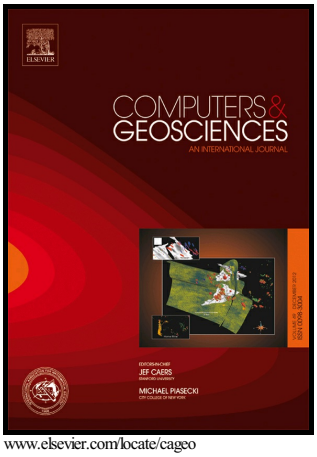


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PII: S0098-3004(17)30390-4
DOI: http://dx.doi.org/10.1016/j.cageo.2017.04.003
Reference: CAGEO3941

To appear in: *Computers and Geosciences*

Received date: 6 January 2016
Revised date: 28 February 2017
Accepted date: 4 April 2017

Cite this article as: Ting Cao, Ancheng Xiao, Lei Wu and Liguang Mao Automatic fracture detection based on Terrestrial Laser Scanning data: a nev method and case study, *Computers and Geosciences* http://dx.doi.org/10.1016/j.cageo.2017.04.003

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# Automatic fracture detection based on Terrestrial Laser Scanning data: a new method and case study

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## Abstract:

Terrestrial laser scanning (TLS), widely known as light detection and ranging (LiDAR) technology, is increasingly used to obtain rapidly three-dimensional (3-D) geometry or highly detailed digital terrain models with millimetric point precision and accuracy. In this contribution, we proposed a simple and unbiased approach to identify fractures directly from 3-D surface model of natural outcrops generated from TLS data and thus acquire surface density, which can provide important supplement data for fracture related research. One outcrop from the Shizigou anticline in the Qaidam Basin (NW China) is taken as the case to validate the method and obtain optimal parameters, according to the references of surface density measured in the field and from the photos taken by high-resolution camera. The results show that with suitable parameters, the proposed method can identify most structural fractures quickly, providing a solution of extracting structural fractures from virtual outcrops based on TLS data. Furthermore, it will help a lot in analyzing the development of fractures and other related fields.

***Key words:*** LiDAR data; 3D geometry; Fracture identification; Surface density

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