

Quaternary Heterogeneities: geospatial products for scientists, industry & decision making

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What are Quaternary Heterogeneities?

The Quaternary is the most recent and current geological period of Earth History. It is characterised by numerous cyclical variations in climate that have acted to drive marked changes in geological 'processes' and their resulting 'products' in the geological record. Understanding the properties and behaviour of these 'products' is not only important to Earth Scientists but also the applied scientific community for managing resources and unforeseen ground conditions.

This poster reports the initial work of a BGS project which seeks to develop a range of thematic national-scale datasets showing the spatial susceptibility of the UK landscape to host a range of 'heterogeneities' that may influence surface or shallow sub-surface properties or behaviour.

How are datasets generated?

Individual datasets incorporate specific 'rules' based upon factors including geology (e.g. rock type, discontinuities), geography (e.g. elevation, aspect, slope angle), palaeoglaciology and known geological history.



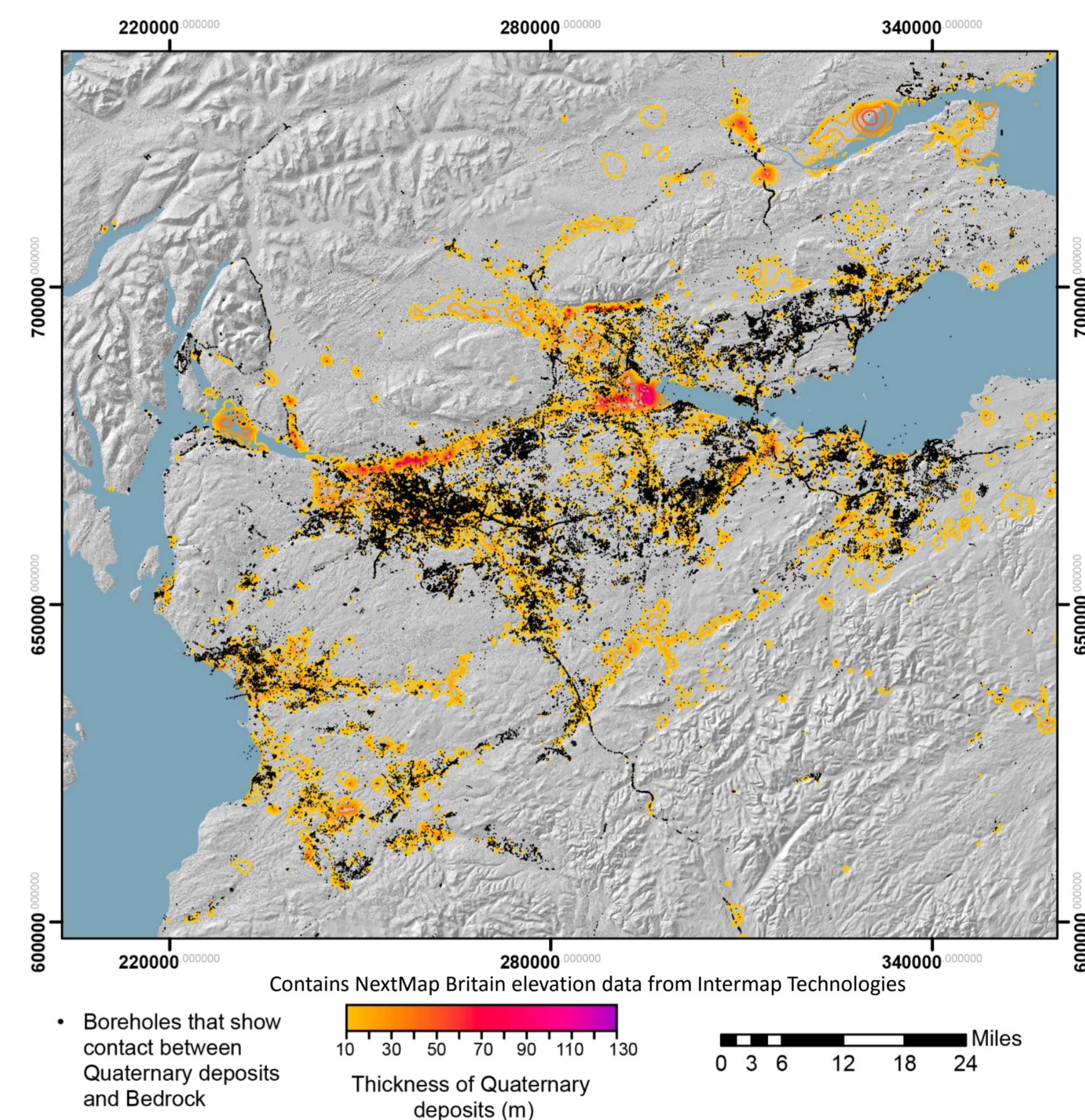
Spatial distribution is constructed manually in areas of known occurrence and extrapolated into areas with limited data coverage geostatistically.

What datasets are being developed?

DATASET	DESCRIPTION OF HETEROGENEITY	APPLIED SIGNIFICANCE
Blockfields	Blocky breakdown of sandstones and some igneous rocks along horizontal and vertical joints.	Unpredictable and unstable ground conditions in upland area. Relevant to cable routing and infrastructure foundations (e.g. wind turbines).
Buried Valleys	Buried subglacial or fluvial valleys that have no expression in the modern landscape.	Sources for minerals and ground source heat. Can cause unusual groundwater behaviour.
Drift-filled hollows	Buried hollows containing drift.	Unpredictable ground conditions for infrastructure and construction. Can cause unpredictable groundwater behaviour.
Glacially-deformed terrains	Terrains deformed by glacial processes with the development of surface and sub-surface discontinuities and structures (folding and faulting).	Unpredictable and ground stability issues including landslides and liquefaction. Increased groundwater mobility and localised groundwater storage.

Case Study 1 – Buried Valleys

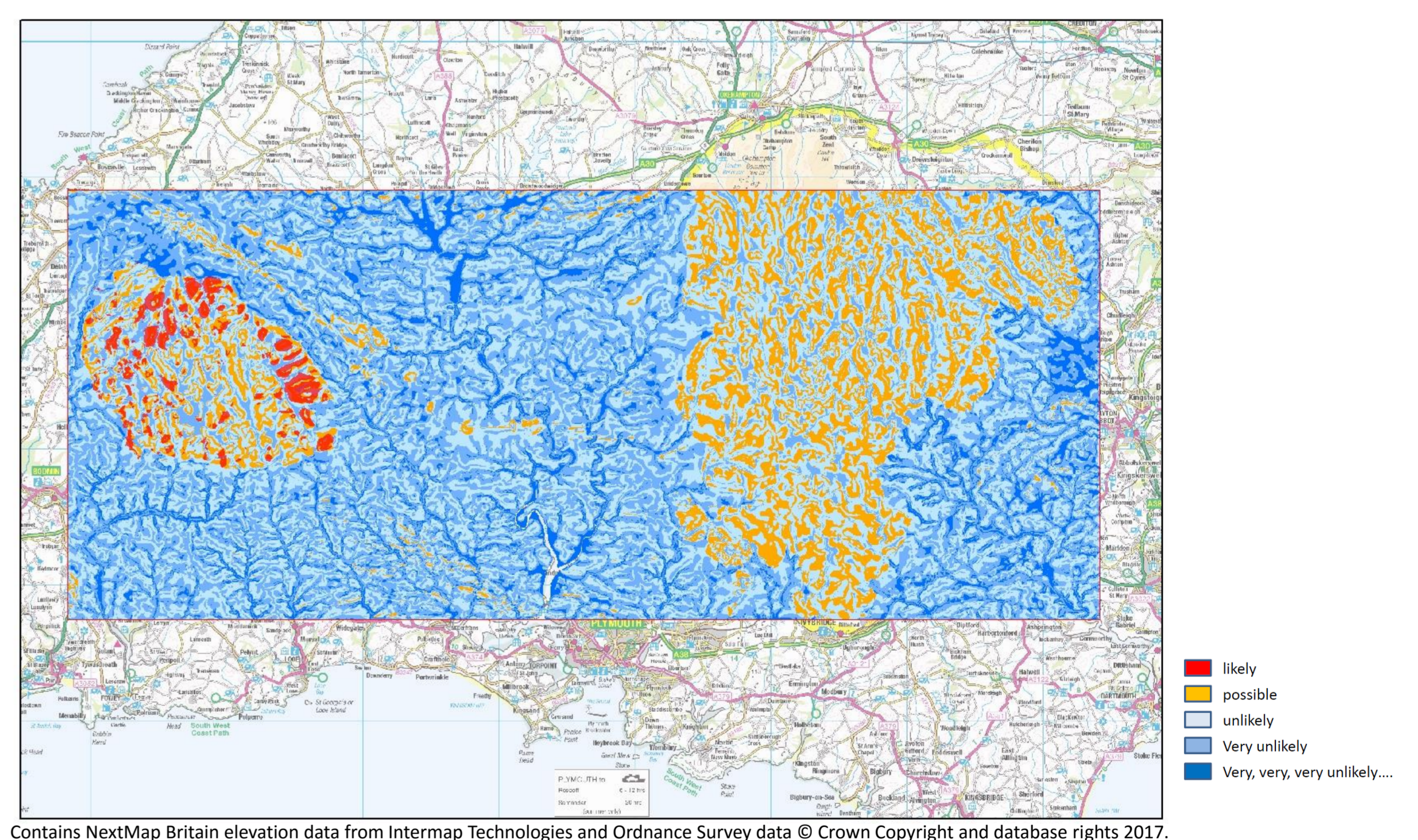
Buried Valleys, including subglacial (tunnel) valleys and palaeo drainage systems, exhibit no surface form in the modern landscape. Typically they are tens of metres depth and may be upto several miles in length.



The distribution of known buried valleys has been investigated using the BGS borehole database (+3,000,000 records). An example output is shown above for the Midland Valley of Scotland. Spatial extrapolation into areas of limited data coverage is currently being undertaken by applying 'average valley types' statistically to glaciological domains.

Case Study 2 – Blockfields

Blockfields comprise an open framework accumulation of boulders at the surface with a component of fines (gravel, silt and clay) beneath the surface.



The distribution of blockfields was generated by developing a set of rules based upon rock type, topography, slope, proximity to Quaternary glaciations (and thermal regime). The data is currently being tested relative to Dartmoor and Bodmin in southwest England (see above) and the Peak District in central England.

What next?

Ongoing development and testing of each of the datasets is currently being undertaken. It is anticipated that data will be released later during 2017 for academic and applied use. If you would like to be involved in trialling the data or contributing to the work please get in-touch.

Contact information

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