# Department of Earth **iences**

## Numerical models on the formation of sills and shallow magma chambers

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### -Introduction -

Deflected sills are formed and may evolve into a shallow magma chamber (Fig. 1) if certain conditions are met: (1) a sill thickness greater than tens of metres, either through sill complex amalgamation or multiple injections and (2) frequent magma replenishment (Gudmundsson, 2011). Magma replenishment is important as magma chambers are defined to be partially or totally molten, acting as a sink receiving magma from a deeper reservoir and as a source to feed a volcanic eruption.

interactions, and differing stress/loading conditions.



### Conclusions

Sills form when a dyke is deflected at a weak contact, by (1) Cook-Gordon debonding, (2) stress barriers and (3) elastic mismatch.

Shallow magma chambers are thought to evolve from large, straight sills where there is a high magma injection rate so the magma chamber remains at least partially molten.

Space must be generated for a magma chamber and this is done via elastic plastic deformation and partial melting of the host 3. rock.

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