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THE NATIONAL GEOSPATIAL CONFERENCE

Presented at the FIG Working Week 2025,  
6-10 April 2025 in Brisbane, Australia  
**FIG** **Geospatial**  
Council of Australia

Brisbane, Australia 6-10 April

Collaboration, Innovation and Resilience: Championing a Digital Generation

# Unveiling land uplift in Ipswich Queensland using InSAR

Armin Agha Karimi and Kyran Cook

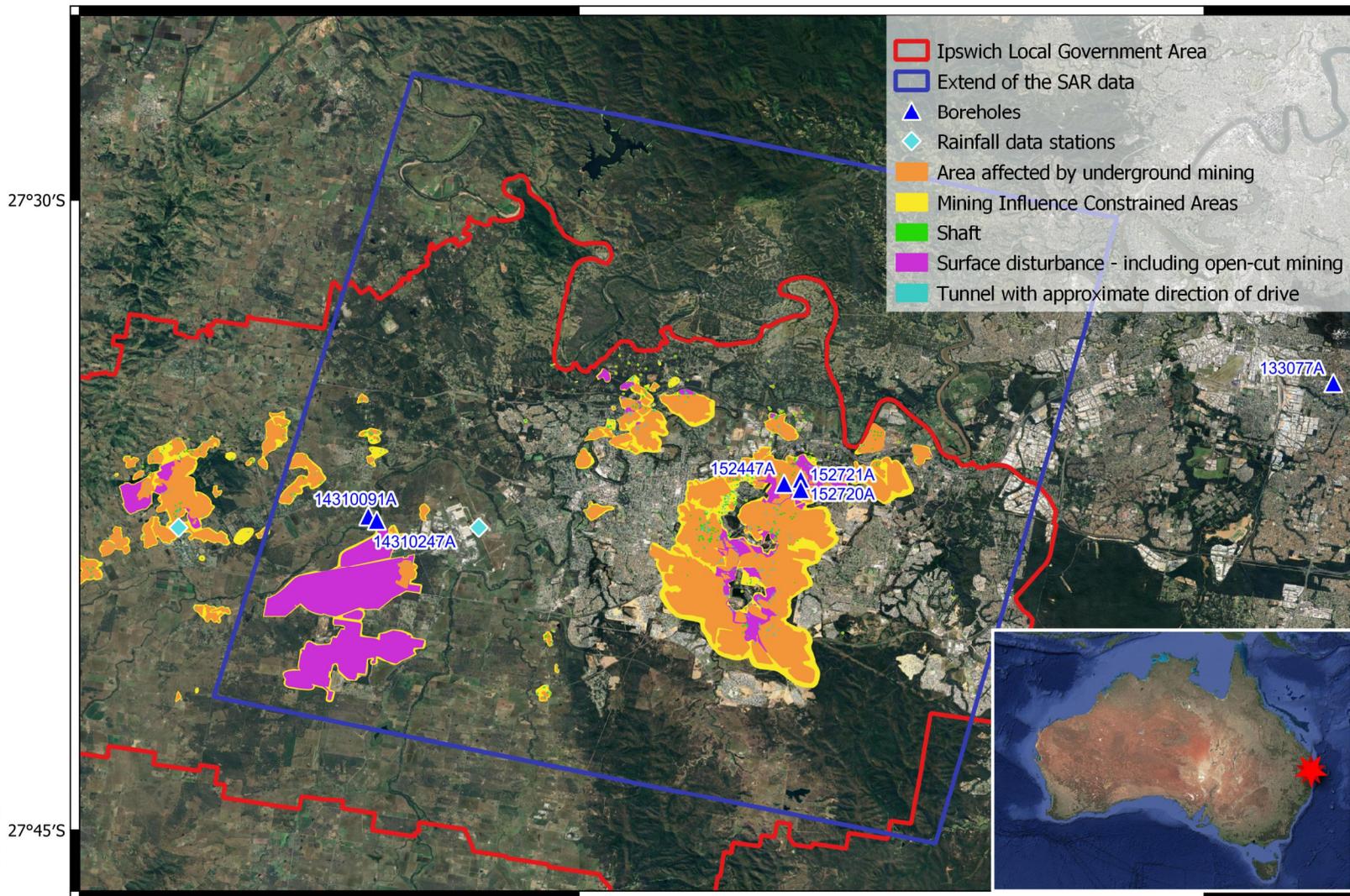


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# Background



In December 1988, 18 Government, four of w

## State Govt ready to demolish mine-

Meg Purtell

Housing Policy

Tue 9 Jun 2009



Homes at Collingwood Park, near Ipswich, were damaged by subsidence in April last year.

## Sinkhole swallows part of Ipswich backyard; abandoned mine may be to blame

By Ellie Sibson

Disasters, Accidents and Emergency Incidents

Wed 3 Aug 2016

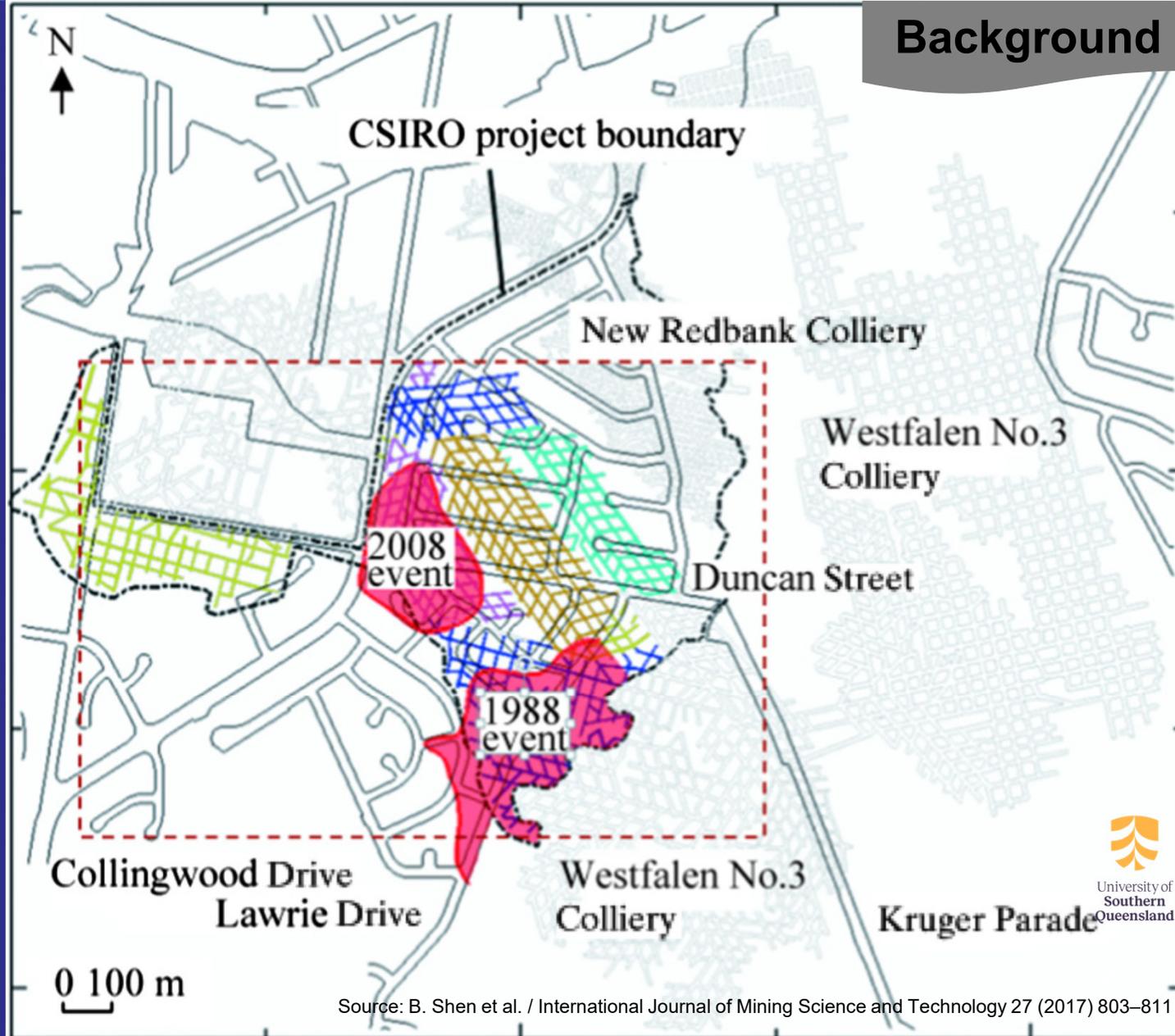


Water was sloshing around inside the huge backyard sinkhole. (ABC News: Ellie Sibson)

Australian Government

# Subsidence cases

- Bord and Pilar mining at depths from approximately 60m to 140m.
- Both subsidence events occurred as a result of pillar failure
- CSIRO project:
  - Numerical modelling
  - Monitoring system combining a micro-seismic network
  - A range of remediation options was investigated.



Source: B. Shen et al. / International Journal of Mining Science and Technology 27 (2017) 803–811

# Background

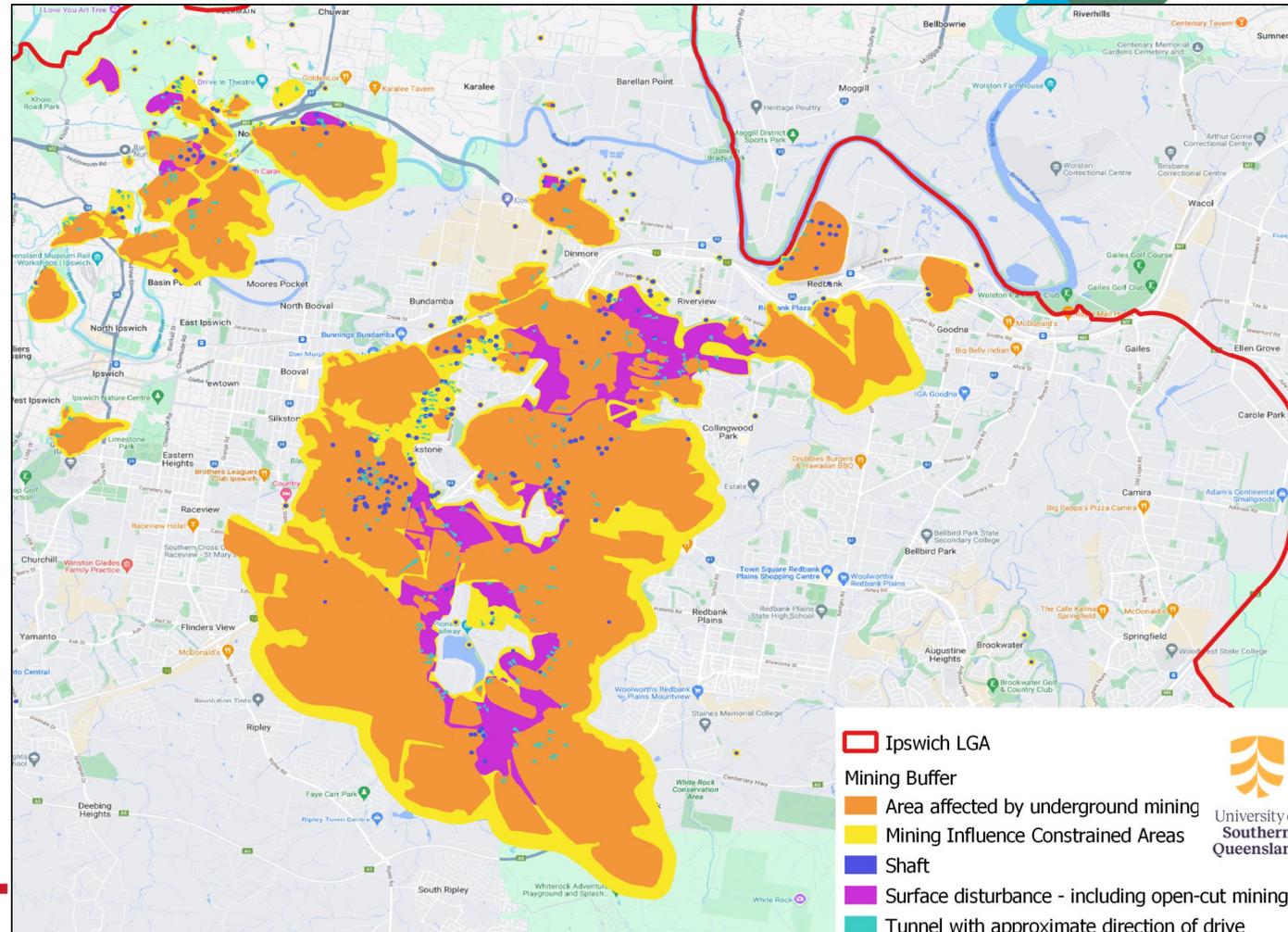
## Mining in Ipswich

**Development of Coal Mines:**  
The first coal mine in the region was established in 1843.

### Mining Types:

- Underground Mining
- Open-Cut Mining

**Abandoned mining areas:**  
Now are urbanised and densely populated.

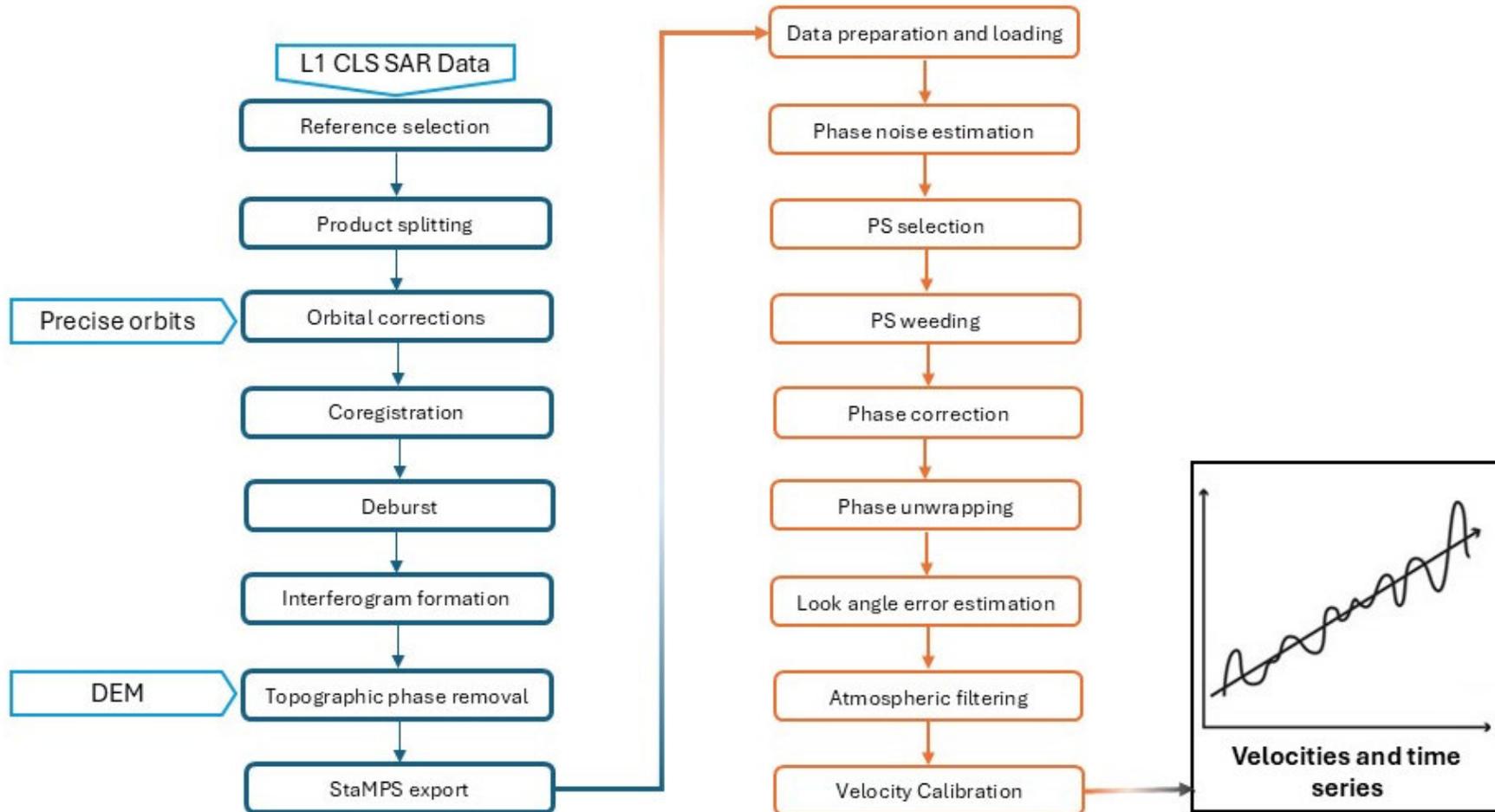


 Ipswich LGA

**Mining Buffer**

-  Area affected by underground mining
-  Mining Influence Constrained Areas
-  Shaft
-  Surface disturbance - including open-cut mining
-  Tunnel with approximate direction of drive







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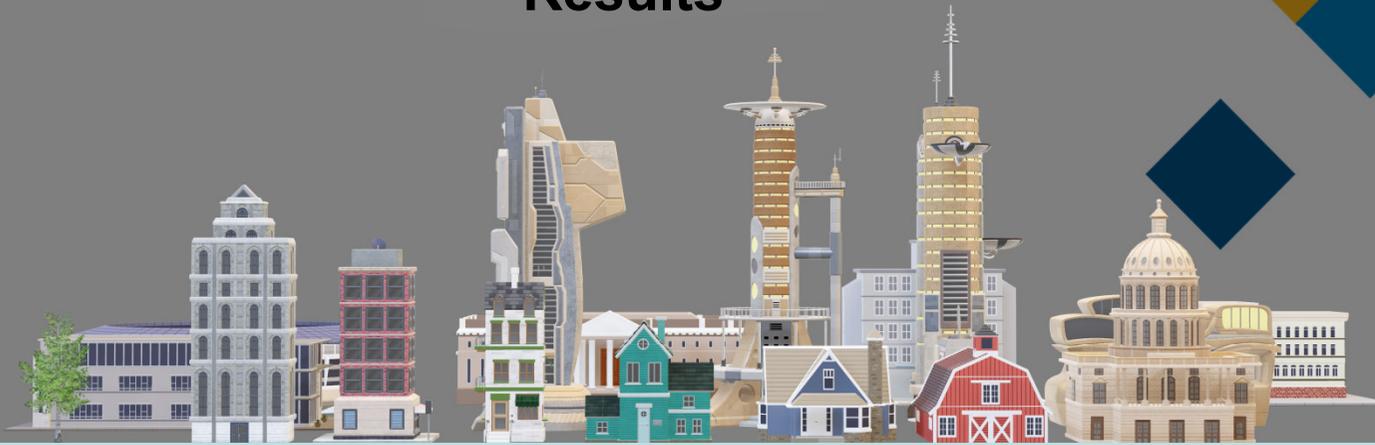
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# Results



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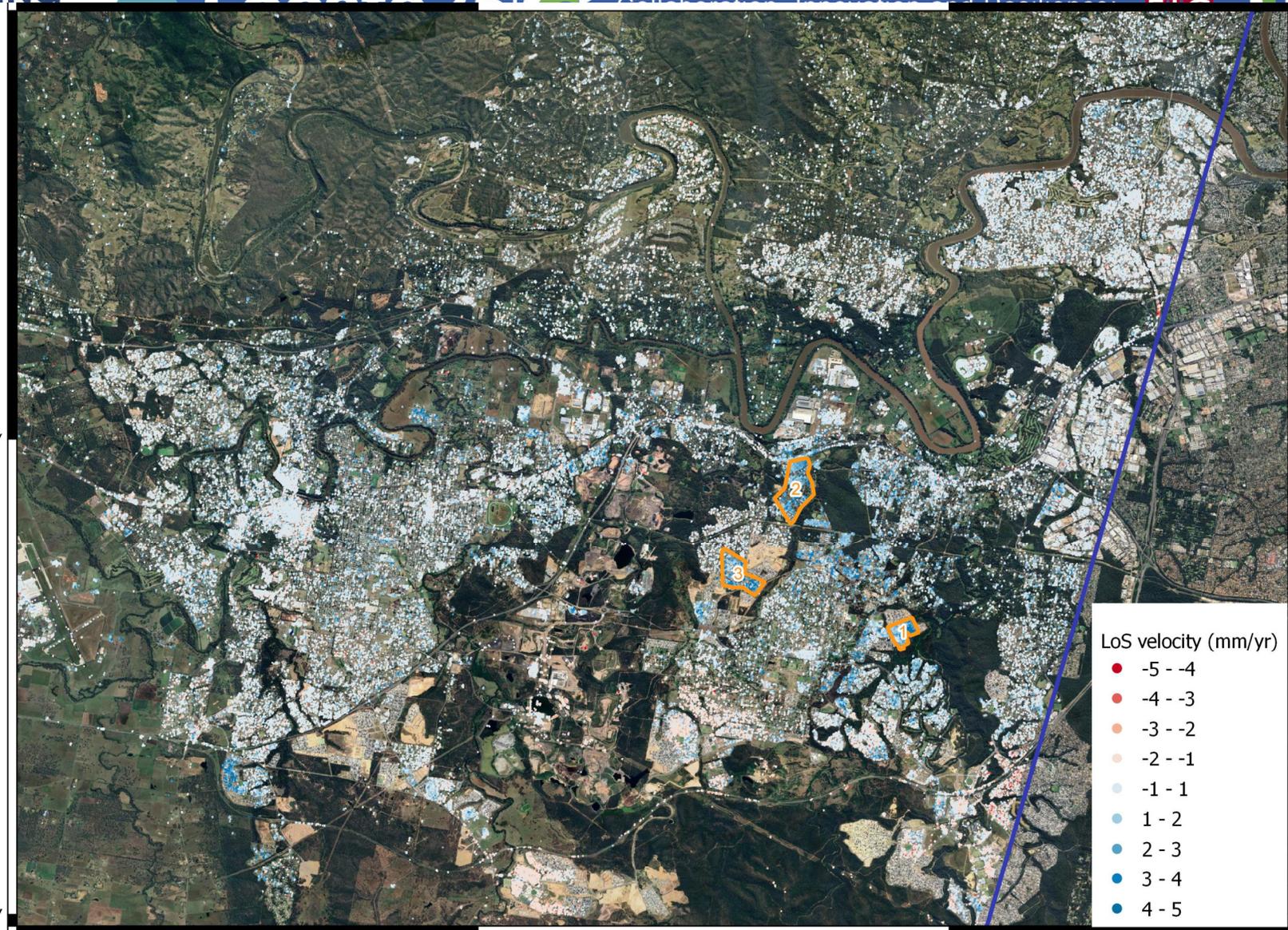
THE SCIENCE OF WHERE™

**Leica**  
Geosystems



-27°36'

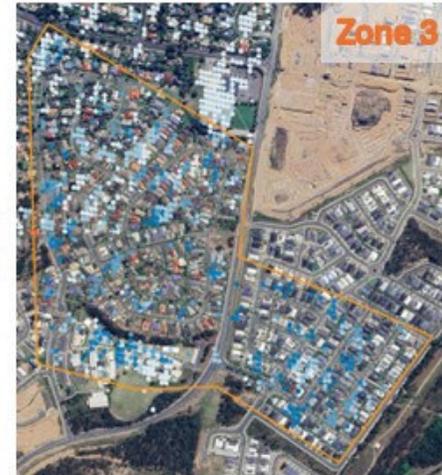
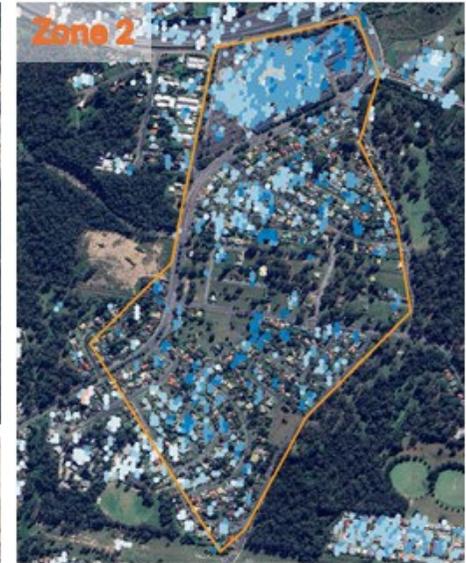
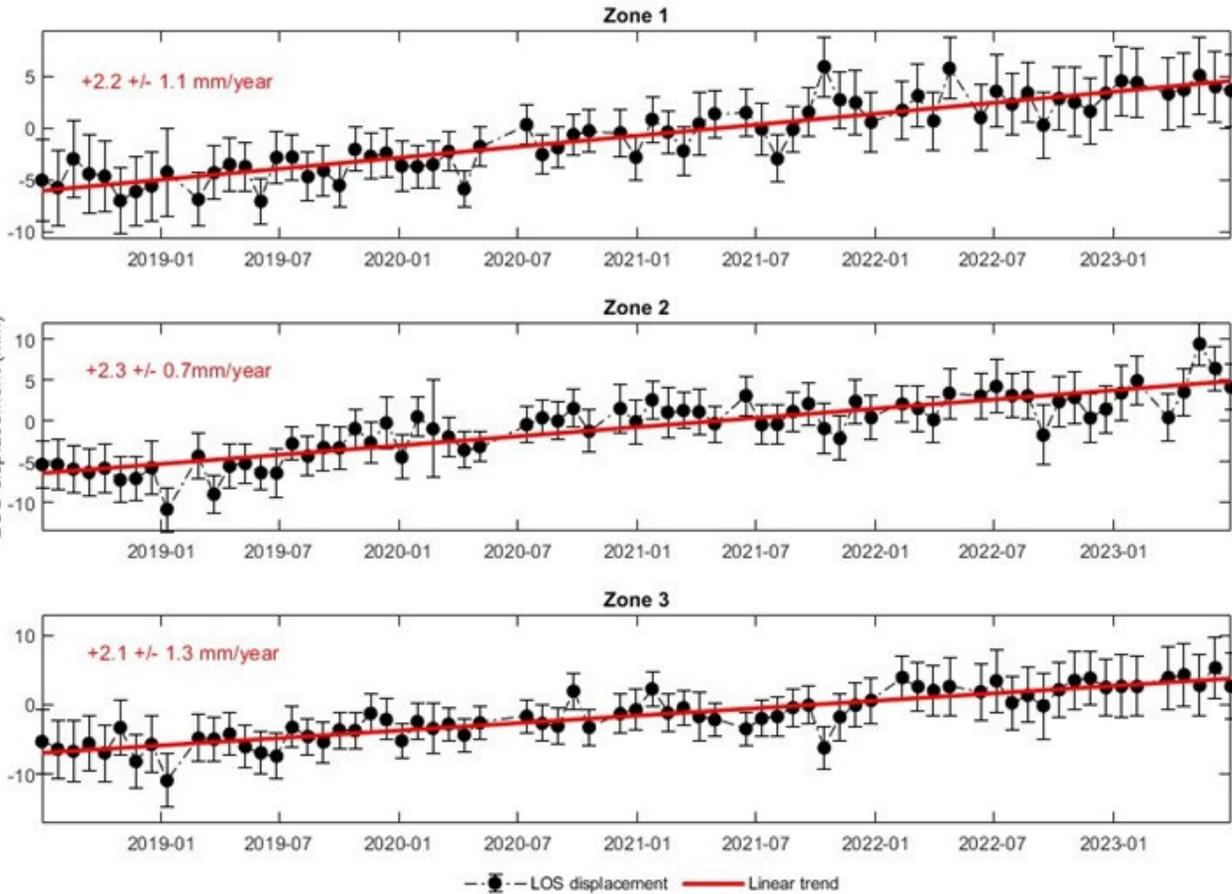
-27°42'



152°48'

152°54'





LoS velocity (mm/yr)

- -5 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5



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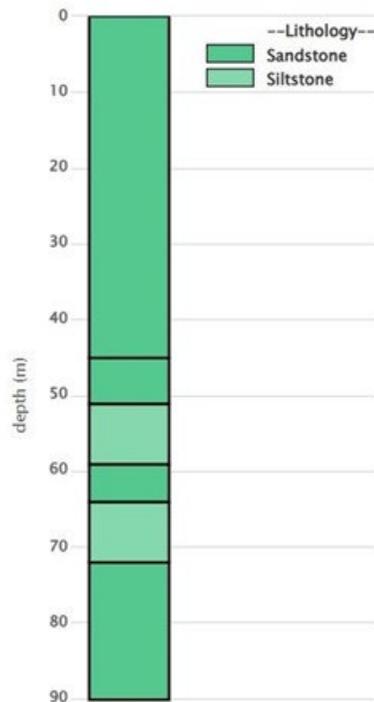
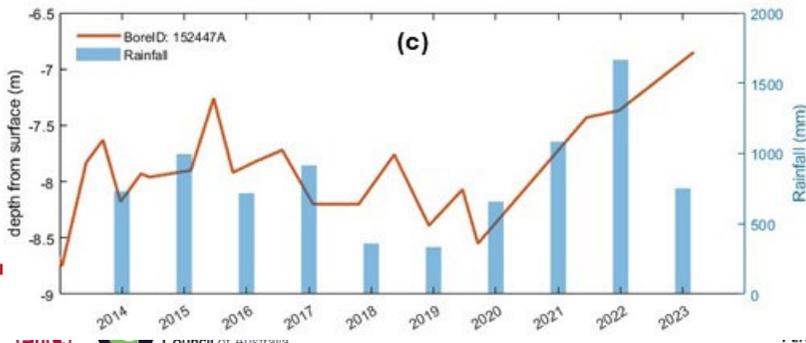
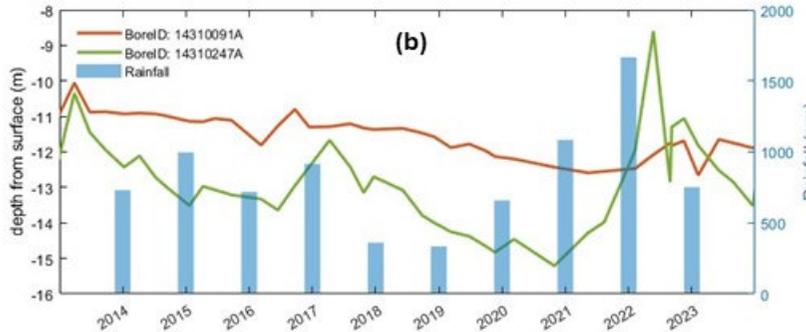
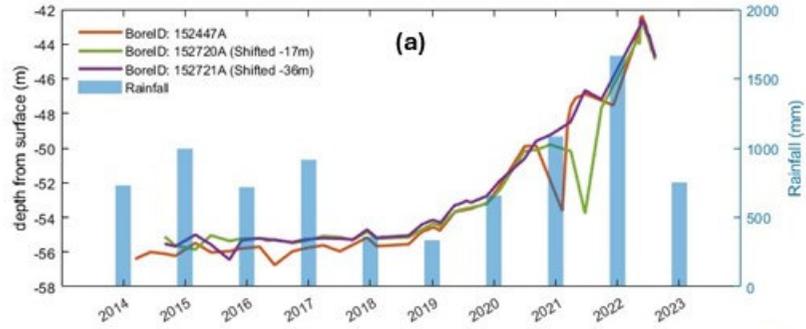


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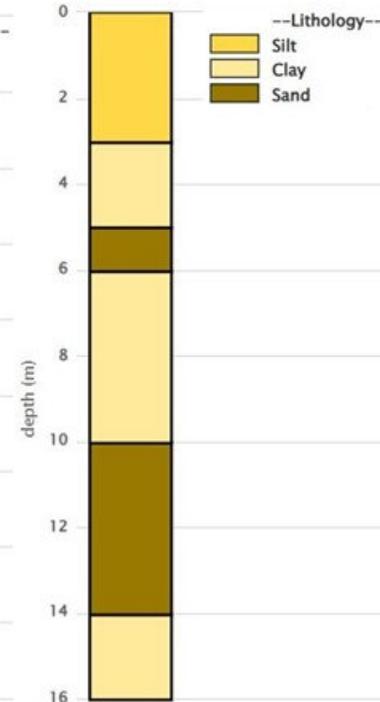


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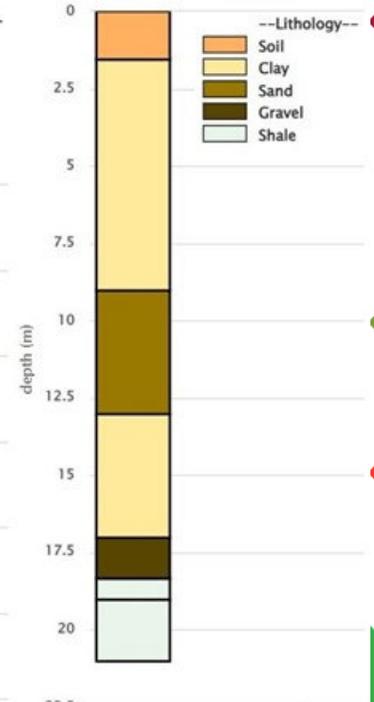
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(e)



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## Conclusion

- From subsidence to uplift
- The role of groundwater
- Necessity for modelling the aquifer water exchange
- Monitoring in the drought era

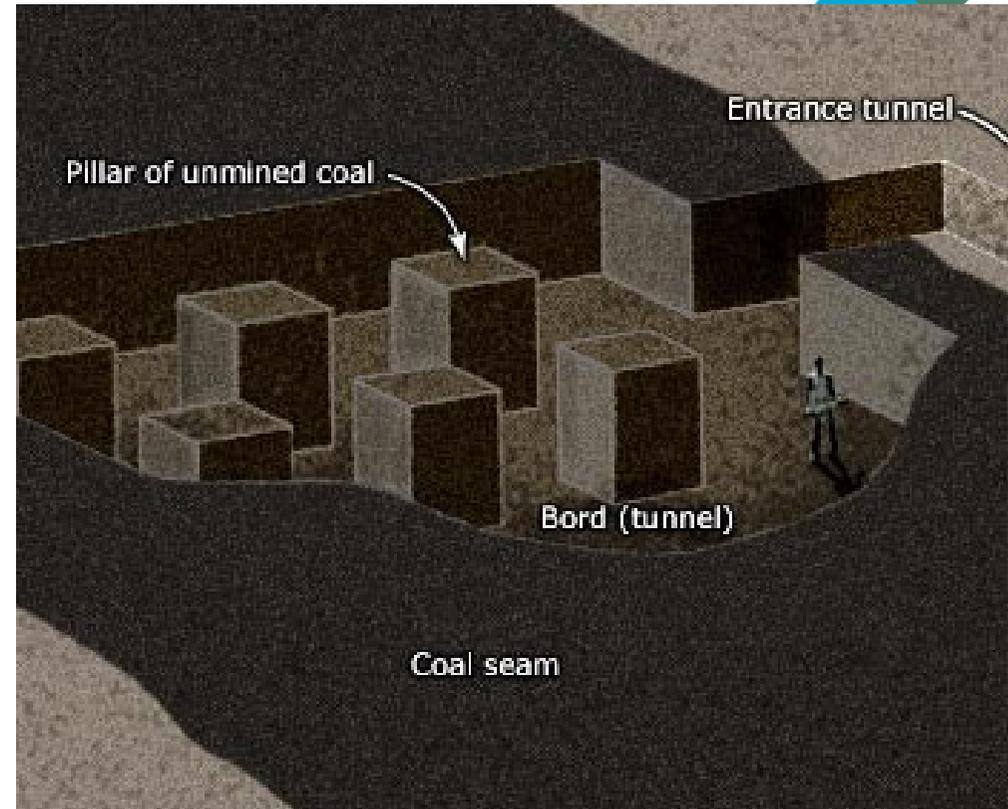


Image courtesy: <https://teara.govt.nz/en/diagram/7445/bord-and-pillar-mining>



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