# Supplementary information

## Twitter text cleaning

**Remove words:**

("utc","km","pm","na","fffef","cm","ms","ki","fe","una","si","fa","b","est","por","les","hai","ka","th","e","le","m","ff","c","ne","dr","cc","ya","ko","es","para","con","di","da","del","se","bfef","fdfef","antiwhale","fb","ada","f","de", "la","eea", "eebeecfccfc","abbasi", "sidna","en", "el","ul", "islam","allah", "de","en", "la","d", "a","muhajir","ur","bread")

**Remove users containing:**

Autism|autism|Autistic|autistic|Autistics|autistics|sk_insar|hamza_insar|lithifer|myjournals

**Scientist classification:**

scientist <- c("\\blectur+|\\bprof\\b|\\bprofessor\\b|\\bprofesseur|\\bprofesor|\\bresearch chair\\b|\\bcrccrc\\b|\\bdean\\b|\\bfaculty\\b|\\bdistinguished chair\\b")

science_students1 <- c('\\bbsc?\\b|\\bmsc?\\b|phd|\\bdphil\\b|\\bdoctoral\\b|\\bmasters\\bgrad+|ologist|ology\\b|oceanography\\b|biome|systems|\\bma\\b|\\bba\\b|science|evolution|istry\\b|ics\\b|\\bmres\\b')

science_students2 <- c('\\bpost?doc|fellow|\\bpost doc\\b|\\bgradschool\\b|\\bstudying\\b|\\bgraduate school\\b')

science_organisations1 <- c('\\bresearch\\b|\\bscien|istry\\b|isheries\\b|olog|\\bstud+|environment|\\bconservation|ogical', '\\bassociation\\b|\\bsynthesis|\\binterdisciplinary\\b|\\bnetwork\\b|\\bdept\\b|\\bdepartment\\b|\\blab|\\balliance\\b|\\bcentre|\\bcenter|\\binitiative\\b|\\bacademicians\\b|\\brepository\\b|\\bforum\\b|\\bsection\\b|\\bmeeting\\b|\\bsociety\\b|\\bchapter\\b|\\bcouncil\\b|university|\\binstitute\\b|\\bcongress\\b|\\bbirdlife|audobon')

science_organisations2 <- c('\\bresearch\\b|\\bscien|istry\\b|isheries\\b|olog|\\bstud+|environment|\\bconservation|ogical', '\\bobservator|\\bsymposi*|\\bpeer ?review\\b|\\bjournal\\b|\\bresearch group\\b|\\bfield station\\b|\\bmeetings\\b')

other scientists <- c('\\btechnician\\b|\\bacademic\\b|\\bdr\\b|research ass+|\\bresearch scientist\\b|\\blab manager\\b|\\bresearcher\\b|\\boceanographer\\b|chemist\\b|ologist\\b|icist\\b|tician\\b|scientist\\b|\\bbotanist\\b|\\bscholar\\b|\\botanist\\b|physicist\\b|\\bnaturalist\\b')

## LiCSAR user feedback questions

## LiCSAR portal user feedback

We are interested to hear how you use COMET LiCSAR data and if you have any suggestions to improve the service. The survey will take approximately 2 minutes to complete and your feedback is greatly appreciated.

The results derived from this survey may be published to report on the usage of LiCSAR data and improve the service, but individual responses will remain anonymous. For further information, please email comet@leeds.ac.uk with the subject 'LiCSAR survey'.

Instructions: Please answer NA for not applicable.

Sign in to Google to save your progress. Learn more

### What is your position?

☐ Academic (undergraduate student)
☐ Academic (postgraduate student)
☐ Academic (early career researcher)
☐ Academic (researcher)
☐ Public Sector
☐ Private Sector
☐ Geological/Geophysics Survey
☐ Volcanic Observatory
☐ Environmental Consultancy
☐ Satellite Services Provider
☐ Development Agency/Charity

### Are you a member of COMET? (https://comet.nerc.ac.uk/)

○ Yes
○ No

### Email address (optional). You will only be contacted in relation to this survey (e.g. to follow up an issue you have identified)

Your answer
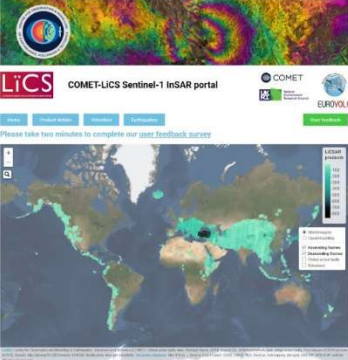
### What is your country of employment?

Your answer

### Please list the countries you have studied using LiCSAR data?

Your answer

COMET LiCSAR portal https://comet.nerc.ac.uk/comet-lics-portal/

### Rate the ease of access to data using the LiCSAR portal

|         | 1 | 2 | 3 | 4 | 5 |      |
|---------|---|---|---|---|---|------|
| Difficult | ○ | ○ | ○ | ○ | ○ | Easy |

### What would make accessing or interpreting LiCSAR data through the portal easier?

Your answer

### Would access to LiCSAR products through a cloud based platform like Google Earth Engine benefit your work?

|            | 1 | 2 | 3 | 4 | 5 |                |
|------------|---|---|---|---|---|----------------|
| No benefit | ○ | ○ | ○ | ○ | ○ | Strong benefit |

### Which LiCSAR products do you use?

☐ Coherence
☐ Wrapped interferograms
☐ Unwrapped interferograms
☐ Quick look PNG images
☐ Look angles
☐ Amplitudes
☐ Digital elevation models

### How do you use LiCSAR products? Please provide links to outputs (blogs, web pages, publications) if applicable

Your answer

### Approximately how many interferograms [date pairs] (e.g. date1_date2) of data have you used?

○ 0-10
○ 11-50
○ 51-100
○ 101-200
○ 201-400
○ Other:

### Approximately how many unique frames of data have you used? (https://comet.nerc.ac.uk/comet-lics-portal/)

○ 1
○ 2-4
○ 5-10
○ 11-20
○ 21-100
○ 101-250
○ Other:

### What additional products would be useful to your work?

☐ Mean velocities
☐ Displacement time series
☐ Integration of LiCSAR products with other data (e.g. optical imagery, land cover, DEMs)
☐ Strain rate
☐ Subsidence/uplift rate
☐ Uncertainties
☐ Other:

### Describe any problems you have had with LiCSAR products. Please include relevant frame IDs if applicable (https://comet.nerc.ac.uk/comet-lics-portal/)

Your answer

### Any other comments

Your answer

Submit     Clear form

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Figure S1. Screenshot of the LiCSAR user feedback survey. LiCSAR Portal map copyright statement: "Leaflet | Centre for Observation and Modelling of Earthquakes, Volcanoes and Tectonics (COMET)., Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community"

**AGUNG VOLCANO, Indonesia
09 Sept. 2017 - 21 Sept. 2017**

COMET

LiCS

S1 unwrapped interferogram

GACOS atmospheric delay
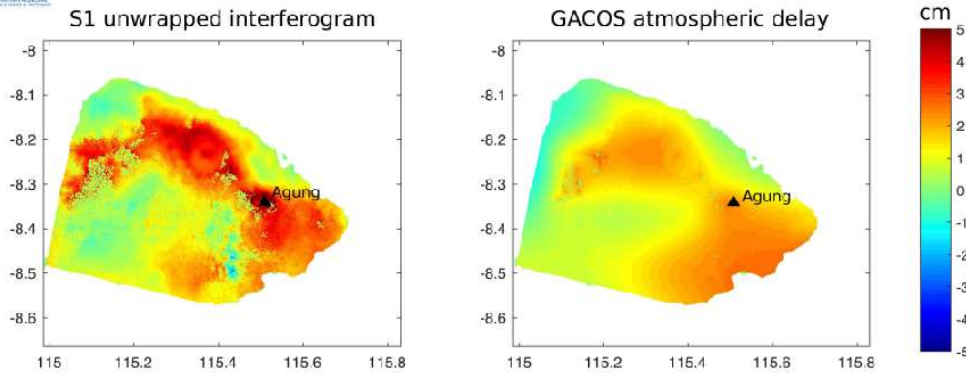
Figure S2. Example Tweet showing the association between apparent InSAR-observed deformation at Agung Volcano and the GACOS atmospheric delay model. The comparison shows that apparent deformation was related to atmospheric signals and not volcanic deformation. Juliet Biggs [Twitter] (2017).

Table S1. InSAR tweet word counts.

| Text of all tweets | | Hashtags of all tweets | | Text and hashtags in the top 50 retweeted tweets | |
|---|---|---|---|---|---|
| Word | Count | Word | Count | Word | Count |
| data | 676 | sentinel1 | 323 | deformation | 11 |
| earthquake | 312 | earthquake | 259 | earthquake | 10 |
| deformation | 269 | sar | 143 | dike | 9 |
| mw | 222 | remotesensing | 116 | data | 8 |
| ground | 200 | comet | 67 | rupture | 7 |
| time | 199 | sar_star | 63 | surface | 7 |
| licsar | 190 | monitoring | 48 | engineer | 6 |
| monitoring | 183 | subsidence | 48 | epicenter | 5 |
| surface | 170 | insar2021 | 46 | eruption | 5 |
| radar | 167 | satellite | 44 | fault | 5 |
| paper | 165 | goldenageofsar | 40 | sentinel | 5 |
| event | 163 | sentinel | 40 | southwest | 5 |
| sentinel | 142 | agu21 | 37 | volcano | 5 |
| satellite | 140 | agu20 | 33 | alos | 4 |
| analysis | 138 | volcano | 31 | displ | 4 |
| venus | 136 | womeninsar | 29 | interferograms | 4 |
| processing | 124 | mining | 27 | magma | 4 |
| page | 121 | earthquakes | 24 | reykjanes | 4 |

| | | | | | |
|---|---|---|---|---|---|
| research | 117 | insar_culturaldiversity | 23 | sar | 4 |
| series | 115 | radar | 23 | satellite | 4 |
| science | 114 | gnss | 22 | sentinel1 | 4 |
| fault | 113 | copernicus | 21 | series | 4 |
| activation | 112 | landslide | 20 | time | 4 |
| los | 108 | landslides | 19 | vertical | 4 |
| sar | 105 | womeninremotesensing | 19 | volcanoes | 4 |
| subsidence | 100 | nyiragongo | 18 | west | 4 |
| based | 99 | womeninstem | 18 | descending | 3 |
| study | 98 | eochat | 17 | gps | 3 |
| displacement | 90 | geohazards | 17 | haiti | 3 |
| earth | 85 | earthobservation | 16 | iceland | 3 |
| check | 83 | lidar | 16 | interferogram | 3 |
| al | 79 | machinelearning | 16 | intrusion | 3 |
| map | 78 | interferometry | 15 | list | 3 |
| motion | 78 | trainingtuesday | 15 | motion | 3 |
| images | 75 | agu2020 | 14 | nyiragongo | 3 |
| remote | 74 | funwithfringes | 14 | processing | 3 |
| topography | 72 | geology | 14 | radar | 3 |
| gps | 70 | geospatial | 14 | results | 3 |
| deep | 69 | nisar | 14 | reykjavk | 3 |
| interferometric | 69 | timeseries | 14 | signal | 3 |
| synthetic | 69 | vegu21 | 14 | slip | 3 |
| talk | 69 | groundwater | 13 | venus | 3 |
| poster | 68 | infrastructure | 13 | academic | 2 |
| field | 66 | reykjanes | 13 | alert | 2 |
| day | 65 | tailings | 13 | applications | 2 |
| results | 65 | webinar | 13 | apply | 2 |
| session | 65 | data | 12 | ascending | 2 |
| technology | 64 | rrm | 12 | awesome | 2 |
| aperture | 63 | space | 12 | based | 2 |
| learn | 63 | engineering | 11 | china | 2 |
| land | 62 | esa | 11 | civil | 2 |
| people | 62 | nasa | 11 | coseismic | 2 |
| emissivity | 61 | satsar | 11 | crater | 2 |
| radio | 61 | bigdata | 10 | crisis | 2 |
| gnss | 60 | deformation | 10 | current | 2 |
| online | 60 | displacement | 10 | damage | 2 |
| seismic | 60 | geodesy | 10 | dataset | 2 |
| sensing | 59 | geomatics | 10 | deep | 2 |
| published | 58 | gis | 10 | deformacin | 2 |
| read | 57 | goma | 10 | desc | 2 |
| team | 55 | groundmotion | 10 | direction | 2 |
| volcano | 55 | hazard | 10 | displacements | 2 |
| hear | 54 | landsubsidence | 10 | east | 2 |

| | | | | | |
|---|---|---|---|---|---|
| magma | 54 | satellites | 10 | eastern | 2 |
| phd | 54 | tsf | 10 | eine | 2 |
| recent | 54 | volcanoes | 10 | fissure | 2 |
| products | 53 | dam | 9 | fringe | 2 |
| phase | 52 | earth | 9 | geodesy | 2 |
| model | 51 | land | 9 | geophysics | 2 |
| spectroscopy | 51 | lapalma | 9 | goldenageofsar | 2 |
| veritas | 50 | miningindustry | 9 | ground | 2 |
| volcanoes | 50 | research | 9 | haitiearthquake2021 | 2 |
| china | 49 | technology | 9 | hiring | 2 |
| join | 49 | veritas | 9 | hundimiento | 2 |
| measurements | 49 | 1stanniversary | 8 | info | 2 |
| movement | 49 | eo | 8 | join | 2 |
| project | 49 | geohazard | 8 | jpl | 2 |
| applications | 48 | geophysics | 8 | land | 2 |
| change | 48 | geotechnical | 8 | lateral | 2 |
| learning | 48 | gps | 8 | location | 2 |

Table S2. Paired words from Twitter followers profile descriptions classified as scientists (n = 11,902). Followers were included if they followed one of the top 10 InSAR tweeters, or the top 10 retweeted InSAR tweeters.

| Paired words | | Occurrences |
|---|---|---|
| remote | sensing | 905 |
| phd | student | 598 |
| phd | candidate | 273 |
| assistant | professor | 202 |
| earth | science | 193 |
| earth | observation | 192 |
| climate | change | 185 |
| earth | sciences | 170 |
| data | science | 136 |
| associate | professor | 121 |
| machine | learning | 113 |
| data | scientist | 109 |
| research | scientist | 99 |
| natural | hazards | 80 |
| structural | geology | 80 |
| research | fellow | 78 |
| student | university | 77 |
| postdoctoral | researcher | 72 |
| earth | scientist | 63 |
| sensing | gis | 62 |
| active | tectonics | 60 |
| environmental | science | 60 |
| ph | student | 59 |

| | | |
|---|---|---|
| graduate | student | 57 |
| research | associate | 57 |
| student | studying | 57 |
| science | technology | 56 |
| phd | researcher | 55 |
| gis | remote | 54 |
| grad | student | 52 |
| opinions | mine | 51 |
| sensing | scientist | 51 |
| geospatial | data | 50 |
| msc | student | 48 |
| ph | candidate | 48 |
| views | mine | 48 |
| research | assistant | 45 |
| climate | scientist | 44 |
| earth | planetary | 44 |
| earthquake | geologist | 44 |
| earthquake | geology | 44 |
| husband | father | 42 |
| structural | geologist | 41 |
| water | resources | 41 |
| geological | survey | 40 |
| planetary | scientist | 39 |
| deep | learning | 38 |
| earth | space | 38 |
| earth | environmental | 37 |
| assistant | prof | 36 |
| asst | prof | 36 |
| department | earth | 36 |
| planetary | science | 36 |
| satellite | data | 36 |
| science | news | 34 |
| science | writer | 34 |
| sea | level | 33 |
| disaster | risk | 32 |
| planetary | sciences | 32 |
| spatial | data | 32 |
| senior | lecturer | 31 |
| university | leeds | 31 |
| assoc | prof | 30 |
| earthquake | engineering | 30 |
| master | student | 30 |
| research | scholar | 30 |
| science | communicator | 30 |
| space | science | 30 |
| earth | system | 29 |
| software | engineer | 29 |
| environmental | sciences | 28 |

| Paired words | | Occurrences |
|---|---|---|
| nature | lover | 28 |
| postdoctoral | fellow | 28 |
| professor | earth | 28 |
| associate | prof | 27 |
| born | ppm | 27 |
| climate | science | 27 |
| geographic | information | 27 |
| geophysics | phd | 27 |
| natural | resources | 27 |

Table S3. Paired words from Twitter followers profile descriptions classified as non-scientists (n = 19,778). Followers were included if they followed one of the top 10 InSAR tweeters, or the top 10 retweeted InSAR tweeters.

| Paired words | | Occurrences |
|---|---|---|
| remote | sensing | 233 |
| earth | observation | 107 |
| climate | change | 51 |
| gis | remote | 50 |
| estudiante | ingeniera | 39 |
| machine | learning | 38 |
| husband | father | 36 |
| los | angeles | 33 |
| sensing | gis | 32 |
| official | twitter | 31 |
| twitter | account | 30 |
| software | engineer | 27 |
| opinions | mine | 26 |
| real | estate | 26 |
| views | expressed | 26 |
| gis | analyst | 25 |
| ingeniera | geofsica | 25 |
| lives | matter | 23 |
| data | analyst | 22 |
| ingeniera | geolgica | 22 |
| social | media | 22 |
| animal | lover | 21 |
| ciencias | tierra | 21 |
| civil | engineer | 21 |
| geospatial | data | 21 |
| oil | gas | 21 |
| black | lives | 20 |
| love | life | 20 |
| gis | specialist | 18 |
| human | rights | 18 |
| ingeniera | unam | 18 |
| puerto | rico | 18 |

| | | |
|---|---|---|
| social | justice | 18 |
| project | manager | 17 |
| wife | mom | 17 |
| cancer | survivor | 16 |
| facultad | ingeniera | 16 |
| food | security | 16 |
| love | family | 16 |
| music | lover | 16 |
| ph | candidate | 16 |
| satellite | imagery | 16 |
| avid | reader | 15 |
| deep | learning | 15 |
| founder | ceo | 15 |
| natural | hazards | 15 |
| nature | lover | 15 |
| web | developer | 15 |
| aperture | radar | 14 |
| business | development | 14 |
| father | husband | 14 |
| geolgica | unam | 14 |
| ingeniero | civil | 14 |
| land | surveyor | 14 |
| personal | account | 14 |
| proud | father | 14 |
| synthetic | aperture | 14 |
| business | owner | 13 |
| husband | dad | 13 |
| tweets | mine | 13 |
| wife | mother | 13 |
| amante | los | 12 |
| amateur | photographer | 12 |
| cuenta | oficial | 12 |
| dad | husband | 12 |
| disaster | risk | 12 |
| dog | lover | 12 |
| estudiante | ing | 12 |
| geospatial | analyst | 12 |
| hugamaur | um | 12 |
| ingeniero | gelogo | 12 |
| mom | wife | 12 |
| mother | grandmother | 12 |
| software | developer | 12 |
| southern | california | 12 |
| views | mine | 12 |
| water | resources | 12 |
| born | raised | 11 |
| content | creator | 11 |

**References:**

Juliet Biggs [@JulietBiggs]: "Weather models show @Agung InSAR fringes are atmospheric NOT deformation. Thanks @falbino @GACOS_Newcastle @USGSVolcanoes @NERC_COMET.", Twitter, available at: https://twitter.com/JulietBiggs/status/912740738710016000 (last access: 13 December 2022), posted: 07:08PM, 26 September 2017.