

## Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

### Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

- The exact sample size ( $n$ ) for each experimental group/condition, given as a discrete number and unit of measurement
- A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
- The statistical test(s) used AND whether they are one- or two-sided  
*Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
- A description of all covariates tested
- A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
- A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
- For null hypothesis testing, the test statistic (e.g.  $F$ ,  $t$ ,  $r$ ) with confidence intervals, effect sizes, degrees of freedom and  $P$  value noted  
*Give  $P$  values as exact values whenever suitable.*
- For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
- For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
- Estimates of effect sizes (e.g. Cohen's  $d$ , Pearson's  $r$ ), indicating how they were calculated

*Our web collection on [statistics for biologists](#) contains articles on many of the points above.*

### Software and code

Policy information about [availability of computer code](#)

Data collection ARIA-SG algorithms used to download data are accessible at: <https://github.com/earthobservatory>.

Data analysis All codes for the analysis of the datasets are available in the following DR-NTU Data repository: <https://doi.org/10.21979/N9/GPVX0F>. ARIA-SG algorithms which contain ISCE algorithms are accessible at: <https://github.com/earthobservatory>. Other InSAR processing algorithms including ARIA-Tools v1.1.1 and MintPy v1.3.0 are open-source and freely available through Github.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [guidelines for submitting code & software](#) for further information.

### Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

All replication data of relative local land subsidence velocities in this study are available in the following DR-NTU Data repository: <https://doi.org/10.21979/N9/GPVX0F>. The vertical land motion rates from the IPCC AR6 are publicly available at [https://podaac-tools.jpl.nasa.gov/drive/files/misc/web/misc/IPCC/IPCC\\_AR6\\_slp\\_regional.tar.gz](https://podaac-tools.jpl.nasa.gov/drive/files/misc/web/misc/IPCC/IPCC_AR6_slp_regional.tar.gz). Glacial isostatic adjustment rates from ICE-6G\_C (VM5a) is publicly available at <https://www.atmosphysics.utoronto.ca/~peltier/data.php>. Plate tectonic boundaries plotted in Fig. 2 are downloadable from <https://www.usgs.gov/media/files/plate-boundaries-kmz-file>. GNSS velocities plotted in Fig. 4 are downloadable from [https://data.lib.vt.edu/articles/dataset/World\\_s\\_Coast\\_Vertical\\_Land\\_Motion/17710973](https://data.lib.vt.edu/articles/dataset/World_s_Coast_Vertical_Land_Motion/17710973).

## Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

Life sciences  Behavioural & social sciences  Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

## Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	For each coastal city we selected, we downloaded and processed Synthetic Aperture Radar (SAR) data to extract velocities of relative local land subsidence. We computed and presented the 95th percentile of negative velocities and the 16th, 50th (median), and 84th percentiles of velocities for each city. We also compared the median and spread of the relative local land subsidence velocities against that of published rates of other components of vertical land motion. Lastly, we used the relative local land subsidence velocities in bathtub models to estimate land areas that will be below mean sea-level in 2030 for two selected coastal cities. We used the mean and +/- one standard deviation of the velocities to compute upper and lower bounds to show the uncertainties associated with the mean estimate.
Research sample	We analyzed SAR data acquired over 48 coastal cities. The SAR data acquired by Copernicus Sentinel-1 satellites operated by the European Space Agency are freely accessible through the Copernicus Open Access Hub. We also referred to existing data of these cities that were published by others. These existing data include vertical land motion rates from the Intergovernmental Panel on Climate Change Sixth Assessment Report (IPCC AR6) and glacial isostatic adjustment rates from the ICE-6G_c (VM5a) model which are both freely accessible.
Sampling strategy	The 48 most populous coastal cities worldwide were selected for analysis, as these are where majority of relative sea-level rise impacts are felt by people. We selected the 48 coastal cities based on a minimum population of 5 million in 2020 and a maximum distance of 50 km from the coast. We also only select coastal cities that are more likely affected by RSLR, if its administrative boundary contains elevations within 5 m from the mean sea-level. We referred to population sizes from the World Urbanization Prospects 2018 dataset and elevations from CoastalDEM, both of which are freely accessible.
Data collection	The SAR data were acquired by the European Space Agency. We downloaded the SAR data from their open access site using ARIA-SG algorithms ( <a href="https://github.com/earthobservatory">https://github.com/earthobservatory</a> ).
Timing and spatial scale	For each coastal city, we downloaded all SAR data captured over the city from a single satellite track that were acquired by the Copernicus Sentinel-1 satellite between October 2014 and April 2020. The track with the best spatial and temporal coverage of the coastal city was selected.
Data exclusions	All SAR scenes must have the same Sentinel-1 Instrument Processing Facility (IPF) versions to be processed together, hence SAR scenes with incompatible IPF versions were excluded. Kuala Lumpur (Malaysia), Pune (India), and Sao Paulo (Brazil) are within the list of most populous coastal cities but excluded due to the absence of elevations within 5 m from the mean sea-level. Shenzhen (China) is also within the list of most populous coastal cities but excluded due to InSAR processing errors (see "InSAR time series processing").
Reproducibility	The ARIA-SG algorithms ( <a href="https://github.com/earthobservatory">https://github.com/earthobservatory</a> ) used to download SAR data, filter out SAR scenes with incompatible IPF versions, and process the data, and ARIA-Tools ( <a href="https://github.com/aria-tools/ARIA-tools">https://github.com/aria-tools/ARIA-tools</a> ) and MintPy ( <a href="https://github.com/insarlab/MintPy/tree/main/mintpy">https://github.com/insarlab/MintPy/tree/main/mintpy</a> ) algorithms used to process the data, are all archived in Github. Code used to load all information of the IPCC AR6 vertical land motion rates and ICE-6G_c (VM5a) glacial isostatic adjustment rates are made available ( <a href="https://doi.org/10.21979/N9/GPVX0F">https://doi.org/10.21979/N9/GPVX0F</a> ). Repeated use of all algorithms give the same result as no randomization is involved. Parameters used for each algorithm are documented in the main text.
Randomization	The processing of relative local land subsidence velocities and calculations of land area and population below mean sea-level involve no randomization. No experiments were conducted.
Blinding	This study is based on remote sensing data i.e. SAR data acquired by satellites. No experiments or surveys were conducted.
Did the study involve field work?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

## Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

## Materials & experimental systems

n/a	Included in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> Antibodies
<input checked="" type="checkbox"/>	<input type="checkbox"/> Eukaryotic cell lines
<input checked="" type="checkbox"/>	<input type="checkbox"/> Palaeontology and archaeology
<input checked="" type="checkbox"/>	<input type="checkbox"/> Animals and other organisms
<input checked="" type="checkbox"/>	<input type="checkbox"/> Human research participants
<input checked="" type="checkbox"/>	<input type="checkbox"/> Clinical data
<input checked="" type="checkbox"/>	<input type="checkbox"/> Dual use research of concern

## Methods

n/a	Included in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> ChIP-seq
<input checked="" type="checkbox"/>	<input type="checkbox"/> Flow cytometry
<input checked="" type="checkbox"/>	<input type="checkbox"/> MRI-based neuroimaging