frontiers

Supplementary Material

Extreme events in biological, societal, and earth sciences: a systematic review of the literature

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Table S1. Complete list of papers analyzed.

Author	Title	Journal / Countribution in
Abadie et al. (2019)	Stochastic diffusion models to describe the evolution of annual heatwave statistics: A three-factor model with risk calculations.	The Science of the total environment
Adam et al. (2016)	A systematic assessment of maritime disruptions affecting UK ports, coastal areas and surrounding seas from 1950 to 2014	Natural Hazards
Ahn and Hwang (2015)	Temporal fluctuation of human occupation during the 7th–3rd millennium cal BP in the central-western Korean Peninsula	Quaternary International
Ameca y Juárez and Jiang (2016)	Flood exposure for vertebrates in China's terrestrial priority areas for biodiversity conservation: Identifying internal refugia	Biological Conservation
Anderson and Bell (2011)	Heat waves in the United States: mortality risk during heat waves and effect modification by heat wave characteristics in 43 U.S. communities	Environmental Health Perspectives
Andrade et al. (2019)	Assessment of two behavioural models (HBM and RANAS) for predicting health behaviours in response to environmental threats: Surface water flooding as a source of groundwater contamination and subsequent waterborne infection in the Republic of Ireland	The Science of the Total Environment
Arias et al. (2016)	Reducing Social Vulnerability to Environmental Change: Building Trust through Social Collaboration on Environmental Monitoring	Weather, Climate, and Society
Aswani et al. (2017)	Environmental and social recovery asymmetries to large-scale disturbances in small island communities	Natural Hazards
Azevedo et al. (2018)	Drought promotes increases in total mercury and methylmercury concentrations in fish from the lower Paraíba do Sul river, southeastern Brazil	Chemosphere
Azuara et al. (2015)	Late Holocene vegetation changes in relation with climate fluctuations and human activity in Languedoc (southern France)	Climate of the Past
Bakker et al. (2013)	Climate, people, fire and vegetation: new insights into vegetation dynamics in the Eastern Mediterranean since the 1st century AD	Climate of the Past
Baldwin et al. (2019)	Temporally Compound Heat Wave Events and Global Warming: An Emerging Hazard	Earth's future
Barrios (2016)	Resilience: A commentary from the vantage point of anthropology	Annals of Anthropological Practice
Bartholy and Pongrácz (2010)	Analysis of precipitation conditions for the Carpathian Basin based on extreme indices in the 20th century and climate simulations for 2050 and 2100	Physics and Chemistry of the Earth, Parts A/B/C
Baum (2018)	Uncertain human consequences in asteroid risk analysis and the global catastrophe threshold	Natural Hazards
Bełdowska and Kobos (2018)	The variability of Hg concentration and composition of marine phytoplankton	Environmental Science and Pollution Research International
Bellprat et al. (2019)	Towards reliable extreme weather and climate event attribution	Nature communications
Benson et al. (2012)	Extreme events, trends, and variability in Northern Hemisphere lake-ice phenology (1855–2005)	Climate Change
Bhattacharjee and Behera (2018)	Does forest cover help prevent flood damage? Empirical evidence from India	Global Environmental Change
Bindi and Olesen (2011)	The responses of agriculture in Europe to climate change	Regional Environmental Change
Birkmann and von Teichman (2010)	Integrating disaster risk reduction and climate change adaptation: key challenges—scales, knowledge, and norms	Sustainability Science
Blumetti et al. (2007)	Reduction of environmental risk from capable faults: The case of the Eastern Etna region (eastern Sicily, Italy)	Quaternary International
Brice et al. (2017)	The Impacts of Climate Change on Natural Areas Recreation: A Multi-Region Snapshot and Agency Comparison	Natural Areas Journal
Bügelmayer-Blaschek et al. (2016)	Internal ice-sheet variability as source for the multi-century and millennial-scale iceberg events during the Holocene? A model study	Quaternary Science Reviews
Bush et al. (2014)	Associations between extreme precipitation and gastrointestinal-related hospital admissions in Chennai, India	Environmental health perspectives
Carey et al. (2012)	An integrated socio-environmental framework for glacier hazard management and climate change adaptation: lessons from Lake 513, Cordillera Blanca, Peru	Climate Change
Cheng and Wu (2013)	Multi-agent-based data exchange platform for bridge disaster prevention: a case study in Taiwan	Natural Hazards

Cheung et al. (2019)	Stable isotope and dental caries data reveal abrupt changes in subsistence economy in ancient China in response to global climate change	PloS one
Christidis et al. (2015)	Dramatically increasing chance of extremely hot summers since the 2003 European heatwave	Nature Climate Change
Clarke et al. (2016)	Climatic changes and social transformations in the Near East and North Africa during the 'long' 4th millennium BC: A comparative study of environmental and archaeological evidence	Quaternary Science Reviews
Coffel et al. (2018)	Temperature and humidity based projections of a rapid rise in global heat stress exposure during the 21st century	Environmental Research Letters
Collins et al. (2014)	Extinction and recolonization of coastal megafauna following human arrival in New Zealand	Proceedings. Biological sciences
Coumou and Rahmstorf (2012)	A decade of weather extremes	Nature Climate Change
Crombé (2018)	Abrupt cooling events during the Early Holocene and their potential impact on the environment and human behaviour along the southern North Sea basin (NW Europe)	Journal of Quaternary Science
Cuenca Cambronero et al. (2018)	Evolution of thermal tolerance in multifarious environments	Molecular ecology
Cunningham et al. (2013)	Identifying biologically meaningful hot-weather events using threshold temperatures that affect life-history	PloS one
Dash and Punia (2019)	Governance and disaster: Analysis of land use policy with reference to Uttarakhand flood 2013, India	International Journal of Disaster Risk Reduction
Diakakis et al. (2012)	Floods in Greece, a statistical and spatial approach	Natural Hazards
Ciurlău (2016)	Early Blizzard Phenomena in Southeastern Romania. Case Study: 2–3 November 1980	Present Environment and Sustainable Development
Edwards et al. (2007)	Separating climatic and possible human impacts in the early Holocene: biotic response around the time of the 8200 cal. yr BP event	Journal of Quaternary Science
Evin et al. (2018)	Has fire policy decreased the return period of the largest wildfire events in France? A Bayesian assessment based on extreme value theory	Natural Hazards and Earth System Sciences
Fedele et al. (2002)	Ecosystem Impact of the Campanian Ignimbrite Eruption in Late Pleistocene Europe	Quaternary Research
Feio et al. (2010)	The influence of extreme climatic events and human disturbance on macroinvertebrate community patterns of a Mediterranean stream over 15 y	Journal of the North American Benthological Society
Feng et al. (2019)	Domino effect of climate change over two millennia in ancient China's Hexi Corridor	Nature Sustainability
Few (2007)	Health and climatic hazards: Framing social research on vulnerability, response and adaptation	Global Environmental Change
Firestone et al. (2007)	Evidence for an extraterrestrial impact 12,900 years ago that contributed to the megafaunal extinctions and the Younger Dryas cooling	Proceedings of the National Academy of Sciences of the United States of America
Fischer and Knutti (2015)	Anthropogenic contribution to global occurrence of heavy-precipitation and high-temperature extremes	Nature Climate Change
Folch et al. (2017)	High-resolution modelling of atmospheric dispersion of dense gas using TWODEE-2.1: application to the 1986 Lake Nyos limnic eruption	Natural Hazards and Earth System Sciences
Fox et al. (2017)	Engineering the Anthropocene: Scalable social networks and resilience building in human evolutionary timescales	The Anthropocene Review
Frazier et al. (2019)	Land surface heterogeneity and tornado occurrence: an analysis of Tornado Alley and Dixie Alley	Geomatics, Natural Hazards and Risk
Gado et al. (2019)	Spatial and temporal rainfall changes in Egypt	Environmental Science and Pollution Research International
García (2019)	From ecological indicators to ecological functioning: Integrative approaches to seize on ecological, climatic and socio-economic databases	Ecological Indicators
Gardezi and Arbuckle (2019)	Spatially Representing Vulnerability to Extreme Rain Events Using Midwestern Farmers' Objective and Perceived Attributes of Adaptive Capacity	Risk Analysis
Gaslikova et al. (2013)	Changes in North Sea storm surge conditions for four transient future climate realizations	Natural Hazards

Ghil et al. (2011)	Extreme events: dynamics, statistics and prediction	Nonlinear Processes in Geophysics
Ghilardi et al. (2012)	The impact of rapid early- to mid-Holocene palaeoenvironmental changes on Neolithic settlement at Nea Nikomideia, Thessaloniki Plain, Greece	Quaternary International
Ghiradri et al. (2015)	The Impact of Heat on an Emergency Department in Italy: Attributable Visits among Children, Adults, and the Elderly during the Warm Season	PloS one
Giguet-Covex et al.(2012)	Frequency and intensity of high-altitude floods over the last 3.5 ka in northwestern French Alps (Lake Anterne)	Quaternary Research
Golden et al. (2008)	A biometeorology study of climate and heat-related morbidity in Phoenix from 2001 to 2006	International journal of biometeorology
Goodess (2013)	How is the frequency, location and severity of extreme events likely to change up to 2060?	Environmental Science & Policy
Gosling et al. (2008)	Glacial-interglacial changes in moisture balance and the impact on vegetation in the southern hemisphere tropical Andes (Bolivia/Peru)	Palaeogeography, Palaeoclimatology, Palaeoecology
Graham et al. (2013)	Managing resilience to reverse phase shifts in coral reefs	Frontiers in Ecology and the Environment
Gray and Mueller (2012)	Natural disasters and population mobility in Bangladesh	Proceedings of the National Academy of Sciences of the United States of America
Green et al. (2010)	An assessment of climate change impacts and adaptation for the Torres Strait Islands, Australia	Climate Change
Gu et al. (2016)	Heat-related illness in China, summer of 2013	International journal of biometeorology
Guo et al. (2018)	Bivariate frequency analysis of flood and extreme precipitation under changing environment: case study in catchments of the Loess Plateau, China	Stochastic Environmental Research and Risk Assessment
Harden (2001)	Sediment movement and catastrophic events: the 1993 rockslide at La Josefina, Ecuador	Physical Geography
Harder-Lauridsen et al. (2013)	Gastrointestinal illness among triathletes swimming in non-polluted versus polluted seawater affected by heavy rainfall, Denmark, 2010-2011	PloS one
Hazeleger et al. (2015)	Tales of future weather	Nature Climate Change
Heyd (2007)	Rapid natural changes: A perspective from environmental philosophy	Quaternary International
Hoffman et al. (2015)	Geo-archaeological evidence for a Holocene extreme flooding event within the Arabian Sea (Ras al Hadd, Oman)	Quaternary Science Reviews
Hölting et al. (2016)	Facing complexity in tropical conservation: how reduced impact logging and climatic extremes affect beta diversity in tropical amphibian assemblages	Biotropica
Hong et al. (2014)	Increasing summer rainfall in arid eastern-Central Asia over the past 8500 years	Scientific Reports
Hong et al. (2019)	Impacts of climate change on future air quality and human health in China	Proceedings of the National Academy of Sciences of the United States of America
Hu et al. (2019)	Hydrological fluctuations modulate phototrophic responses to nutrient fertilization in a large and shallow lake of Southwest China	Aquatic Sciences
Hu et al. (2018)	Flood-induced mortality across the globe: Spatiotemporal pattern and influencing factors	The Science of the total environment
Huang et al. (2013)	Palaeoenvironmental implications of the prehistorical catastrophes in relation to the Lajia Ruins within the Guanting Basin along the Upper Yellow River, China	The Holocene
Huang et al. (2019)	What caused the cultural hiatus in the Iron-Age Kiwulan Site, northeastern Taiwan?	Quaternary International
Huguet et al. (2008)	Is there a trend in extremely high river temperature for the next decades? A case study for France	Natural Hazards and Earth System Sciences
Hulme (2014)	Attributing weather extremes to 'climate change'	Progress in Physical Geography: Earth and Environment
Hunt (2002)	Floods in a changing climate: a review	Philosophical transactions. Series A, Mathematical, physical, and engineering sciences

Innes et al. (2014)	Climatic and palaeoecological changes during the mid- to Late Holocene transition in eastern China: high-resolution pollen and non-pollen palynomorph analysis at Pingwang, Yangtze coastal lowlands	Quaternary Science Reviews
Jegasothy et al. (2017)	Extreme climatic conditions and health service utilisation across rural and metropolitan New South Wales	International journal of biometeorology
Jenerette et al. (2011)	Ecosystem services and urban heat riskscape moderation: water, green spaces, and social inequality in Phoenix, USA	Ecological Applications
Jiang et al. (2009)	Ensemble projection of 1–3°C warming in China	Chinese Science Bulletin
Jones (2019)	Climate Change and Farming Response in a Temperate Oceanic Zone—the Exploitation of a Karstic Region in Western Ireland in the Third and Second Millennia BC	The Journal of Island and Coastal Archaeology
Justić et al. (2003)	Climatic influences on riverine nitrate flux: Implications for coastal marine eutrophication and hypoxia	Estuaries
Kaal et al. (2014)	Contribution of organic matter molecular proxies to interpretation of the last 55ka of the Lynch's Crater record (NE Australia)	Palaeogeography, Palaeoclimatology, Palaeoecology
Kaiser (2007)	World offshore energy loss statistics	Energy Policy
Kalkstein et al. (2011)	An evaluation of the progress in reducing heat-related human mortality in major U.S. cities	Natural Hazards
Kappes et al. (2011)	Assessment of debris-flow susceptibility at medium-scale in the Barcelonnette Basin, France	Natural Hazards and Earth System Sciences
Kershaw and Millward (2012)	A spatio-temporal index for heat vulnerability assessment	Environmental monitoring and assessment
Khalid and Ali (2020)	Economic impact assessment of natural disaster with multi-criteria decision making for interdependent infrastructures	Environment, Development and Sustainability
Kirchmeier-Young et al. (2017)	Attributing extreme fire risk in Western Canada to human emissions	Climate Change
Lara et al. (2009)	Influence of catastrophic climatic events and human waste on Vibrio distribution in the Karnaphuli estuary, Bangladesh	EcoHealth
Li et al. (2013)	Relationship between environmental change and human activities in the period of the Shijiahe culture, Tanjialing site, Jianghan Plain, China	Quaternary International
Li et al. (2010a)	Distribution and migration of nitrobenzene in water following a simulated spill	Journal of Hazardous Materials
Li et al. (2016)	Aging Will Amplify the Heat-related Mortality Risk under a Changing Climate: Projection for the Elderly in Beijing, China	Scientific reports
Lie et al. (2010b)	Spatial distribution and temporal trends of extreme temperature and precipitation events on the Loess Plateau of China during 1961–2007	Quaternary International
Llanes Cárdenas et al. (2016)	Estimating Trends and Return Periods of Daily Extreme Precipitation Associated with Tropical Cyclones in the Core North American Monsoon	Polish Journal of Environmental Studies
López et al. (2019)	Spatio-temporal analysis of leptospirosis incidence and its relationship with hydroclimatic indicators in northeastern Argentina	The Science of the Total Environment
Lu et al. (2016)	Unveiling hidden migration and mobility patterns in climate stressed regions: A longitudinal study of six million anonymous mobile phone users in Bangladesh	Global Environmental Change
Madsen et al. (2007)	Changing views of Late Quaternary human adaptation in arid China	Developments in Quaternary Sciences
Margolis (2021)	Heat Waves and Rising Temperatures: Human Health Impacts and the Determinants of Vulnerability	Climate Change and Global Public Health
Marmureanu et al. (2013)	Essential tools to mitigate Vrancea strong earthquakes effects on Moldavian urban environment	Environmental Engineering and Management Journal
Marriner et al. (2013)	Tracking Nile Delta vulnerability to Holocene change	PloS one
Matthews et al. (2017)	Communicating the deadly consequences of global warming for human heat stress	Proceedings of the National Academy of Sciences of the United States of America
Mayewski et al. (2014)	Holocene warming marked by abrupt onset of longer summers and reduced storm frequency around Greenland	Journal of Quaternary Science
Mendoza-Cantú et al. (2011)	Identification of environmentally vulnerable areas with priority for prevention and management of pipeline crude oil spills	Journal of environmental management
Messerli (2000)	From nature-dominated to human-dominated environmental changes	Quaternary Science Reviews

Miao et al. (2015)	Shifts in vegetation growth in response to multiple factors on the Mongolian Plateau from 1982 to 2011	Physics and Chemistry of the Earth, Parts A/B/C
Miao et al. (2017)	Holocene fire on the northeast Tibetan Plateau in relation to climate change and human activity	Quaternary International
Middleton et al. (2019)	Sand and dust storms: underrated natural hazards	Disasters
Mitchell et al. (2006)	Extreme events due to human-induced climate change	Philosophical transactions. Series A, Mathematical, physical, and engineering sciences
Modarres (2007)	Streamflow drought time series forecasting	Stochastic Environmental Research and Risk Assessment
Modarres et al. (2018)	Future heat stress arising from climate change on Iran's population health	International journal of biometeorology
Moreno et al. (2019)	Early arboreal colonization, postglacial resilience of deciduous Nothofagus forests, and the Southern Westerly Wind influence in central-east Andean Patagonia	Quaternary Science Reviews
Mulholland et al. (2009)	Stream ecosystem responses to the 2007 spring freeze in the southeastern United States: unexpected effects of climate change	Global change biology
Muthusankar (2018)	When Socio-Economic Plans Exacerbate Vulnerability to Physical Coastal Processes on the South East Coast of India	Journal of Coastal Research
Nel et al. (2014)	Natural hazards in a changing world: a case for ecosystem-based management	PloS one
Nesbitt (2016)	El Niño and second-millennium BC monument building at Huaca Cortada (Moche Valley, Peru)	Antiquity
Nichols et al. (2010)	Using the reference condition maintains the integrity of a bioassessment program in a changing climate	Journal of the North American Benthological Society
Norris and Röhl (1999)	Carbon cycling and chronology of climate warming during the Palaeocene/Eocene transition	Nature
Nuthammachot and Stratoulias (2021)	A GIS- and AHP-based approach to map fire risk: a case study of Kuan Kreng peat swamp forest, Thailand	Geocarto International
Oliveira et al. (2014)	Interplay of experimental harvesting and climate-related disturbance on benthic assemblages of rocky seashores	Marine Ecology Progress Series
Oppenheimer (2002)	Limited global change due to the largest known Quaternary eruption, Toba ≈74kyr BP?	Quaternary Science Reviews
Panin et al. (2009)	Long-term development of Holocene and Pleistocene gullies in the Protva River basin, Central Russia	Geomorphology
Parasiewicz (2007)	Using MesoHABSIM to develop reference habitat template and ecological management scenarios	River Research and Applications
Passmore et al. (2008)	Late Holocene Debris Flows and Valley Floor Development in The Northern Zailiiskiy Alatau, Tien Shan Mountains, Kazakhstan	Arctic, Antarctic, and Alpine Research
Paulette (2012)	Domination and Resilience in Bronze Age Mesopotamia	Surviving Sudden Environmental Change
Pawson (2011)	Environmental hazards and natural disasters	New Zealand Geographer
Pedersen (2008)	The sequelae of political violence: assessing trauma, suffering and dislocation in the Peruvian highlands	Social Science & Medicine
Peng et al. (2011)	Toward a quantitative estimate of future heat wave mortality under global climate change	Environmental health perspectives
Pepe et al. (2016)	Late Holocene pollen record from Fiume Morto (Dead River), a palaeomeander of Tiber River near Ancient Ostia (central Italy)	Journal of Paleolimnology
Peters and Buttle (2010)	The effects of flow regulation and climatic variability on obstructed drainage and reverse flow contribution in a Northern river-lake-Delta complex, Mackenzie basin headwaters	River Research and Applications
Pettay et al. (2015)	Microbial invasion of the Caribbean by an Indo-Pacific coral zooxanthella	Proceedings of the National Academy of Sciences of the United States of America
Plumlee et al. (2016)	Anticipating Environmental and Environmental-Health Implications of Extreme Storms: ARkStorm Scenario	Natural Hazards Review
Porter et al. (2013)	Interactive effects of anthropogenic nitrogen enrichment and climate change on terrestrial and aquatic biodiversity	Biogeochemistry
Pricope et al. (2013)	The climate-population nexus in the East African Horn: Emerging degradation trends in rangeland and pastoral livelihood zones	Global Environmental Change
Prieto (2000)	Vegetational history of the Late glacial–Holocene transition in the grasslands of eastern Argentina	Palaeogeography, Palaeoclimatology, Palaeoecology

Christy (2019)	Examination of Extreme Rainfall Events in Two Regions of the United States since the 19th Century	AIMS Environmental Science
Rao (2009)	Modeling and analysis of global epidemiology of avian influenza	Environmental Modelling & Software
Räsänen et al. (2016)	On the spatial and temporal variability of ENSO precipitation and drought teleconnection in mainland Southeast Asia	Climate of the Past
Rebetez (1996)	Public expectation as an element of human perception of climate change	Climate Change
Ren et al. (2016)	Century-long increasing trend and variability of dissolved organic carbon export from the Mississippi River basin driven by natural and anthropogenic forcing	Global Biogeochemical Cycles
Richts and Vrba (2016)	Groundwater resources and hydroclimatic extremes: mapping global groundwater vulnerability to floods and droughts	Environmental Earth Sciences
Riede (2014)	Towards a science of past disasters	Natural Hazards
Rohli et al. (2016)	Drought indices as drought predictors in the south-central USA	Natural Hazards
Sampson et al. (2013)	Staying cool in a changing climate: Reaching vulnerable populations during heat events	Global Environmental Change: Human and Policy Dimensions
Saunders (1999)	Earth's future climate	Philosophical transactions. Series A, Mathematical, physical, and engineering sciences
Schneider and Root (1996)	Ecological implications of climate change will include surprises	Biodiversity and Conservation
Schröder et al. (2018)	Holocene climatic and environmental evolution on the southwestern Iberian Peninsula: A high-resolution multi-proxy study from Lake Medina (Cádiz, SW Spain)	Quaternary Science Reviews
Scoccimarro et al. (2017)	The role of humidity in determining scenarios of perceived temperature extremes in Europe	Environmental Research Letters
Sena et al. (2014)	Managing the health impacts of drought in Brazil	International journal of environmental research and public health
Sexton and Harris (2015)	The importance of including variability in climate change projections used for adaptation	Nature Climate Change
Singh et al. (2019)	Indian summer monsoon: Extreme events, historical changes, and role of anthropogenic forcings	Wiley Interdisciplinary Reviews: Climate Change
Skerratt (2013)	Enhancing the analysis of rural community resilience: Evidence from community land ownership	Journal of Rural Studies
Small and Xian (2018)	A human-environmental network model for assessing coastal mitigation decisions informed by imperfect climate studies	Global Environmental Change
Smid et al. (2019)	Ranking European capitals by exposure to heat waves and cold waves	Urban Climate
Smith and Sheridan (2019)	The influence of extreme cold events on mortality in the United States	The Science of the total environment
Smith et al. (2013)	Heat waves in the United States: definitions, patterns and trends	Climaet Change
Smith and Dressler (2019)	Governing vulnerability: The biopolitics of conservation and climate in upland Southeast Asia	Political Geography
Smoyer (1998)	Putting risk in its place: methodological considerations for investigating extreme event health risk	Social Science & Medicine
Souch and Grimmond (2004)	Applied climatology: 'heat waves'	Progress in Physical Geography: Earth and Environment
Stanchi et al. (2012)	The influence of Alpine soil properties on shallow movement hazards, investigated through factor analysis	Natural Hazards and Earth System Sciences
Sun et al. (2019)	Global heat stress on health, wildfires, and agricultural crops under different levels of climate warming	Environment international
Sung et al. (2013)	Relationship between heat index and mortality of 6 major cities in Taiwan	The Science of the total environment
Telesca et al. (2018)	Effects on Public Health of Heat Waves to Improve the Urban Quality of Life	Sustainability
Tessler et al. (2015)	Profiling risk and sustainability in coastal deltas of the world	Science
Thieken et al. (2016)	The flood of June 2013 in Germany: how much do we know about its impacts?	Natural Hazards and Earth System Sciences
Tichavský et al. (2018)	Increased gully activity induced by short-term human interventions – Dendrogeomorphic research based on exposed tree roots	Applied Geography

Tzavella et al. (2018)	Opportunities provided by geographic information systems and volunteered geographic information for a timely emergency response during flood events in Cologne, Germany	Natural Hazards
Vanos (2015)	Association of weather and air pollution interactions on daily mortality in 12 Canadian cities	Air Quality, Atmosphere, & Health
Vergari et al. (2013)	Long- and short-term evolution of several Mediterranean denudation hot spots: The role of rainfall variations and human impact	Geomorphology
Viglizzo and Frank (2006)	Ecological interactions, feedbacks, thresholds and collapses in the Argentine Pampas in response to climate and farming during the last century	Quaternary International
de León and Bogardi (2010)	Focusing on the Environment and Human Security Nexus	Geophysical Hazards
Voelkel et al. (2018)	Assessing Vulnerability to Urban Heat: A Study of Disproportionate Heat Exposure and Access to Refuge by Socio-Demographic Status in Portland, Oregon	International journal of environmental research and public health
Vött et al. (2019)	Publicity waves based on manipulated geoscientific data suggesting climatic trigger for majority of tsunami findings in the Mediterranean – Response to 'Tsunamis in the geological record: Making waves with a cautionary tale from the Mediterranean' by Marriner et al. (2017)	Zeitschrift für Geomorphologie, Supplementary Issues
Wang et al. (2016)	Heavy metal accumulation during the last 30 years in the Karnaphuli River estuary, Chittagong, Bangladesh	SpringerPlus
Wang et al. (2014)	Drought analysis of the Haihe river basin based on GRACE terrestrial water storage	TheScientificWorldJournal
Wang et al. (2019)	The exposure of slums to high temperature: Morphology-based local scale thermal patterns	The Science of the total environment
Wang et al. (2012)	Changes in fire regimes on the Chinese Loess Plateau since the last glacial maximum and implications for linkages to paleoclimate and past human activity	Palaeogeography, Palaeoclimatology, Palaeoecology
Whitington (2013)	Fingerprint, bellwether, model event: Climate change as speculative anthropology	Anthropological Theory
Winter et al. (2019)	Future Extreme Event Risk in the Rural Northeastern United States	Annals of the American Association of Geographers
Wohl et al. (2018)	River beads as a conceptual framework for building carbon storage and resilience to extreme climate events into river management	Biogeochemistry
Wright et al. (2013)	The Anthropology of Dust: Community Responses to Wind-Blown Sediments within the Middle Gila River Valley, Arizona	Human Ecology
Wu et al. (2017)	Joint pattern of seasonal hydrological droughts and floods alternation in China's Huai River Basin using the multivariate L-moments	Journal of Earth System Science
Wu et al. (2019)	Integrate Risk From Climate Change in China Under Global Warming of 1.5 and 2.0 °C	Earth's future
Wu et al. (2015)	Spatio-temporal patterns of drought in North Xinjiang, China, 1961–2012 based on meteorological drought index	Journal of Arid Land
Yamano et al. (2007)	Atoll island vulnerability to flooding and inundation revealed by historical reconstruction: Fongafale Islet, Funafuti Atoll, Tuvalu	Global and Planetary Change
Yeakal et al. (2014)	Collapse of an ecological network in Ancient Egypt	Proceedings of the National Academy of Sciences of the United States of America
Youssef et al. (2015)	Flash flood susceptibility assessment in Jeddah city (Kingdom of Saudi Arabia) using bivariate and multivariate statistical models	Environmental Earth Sciences
Yuan et al. (2019)	Anthropogenic shift towards higher risk of flash drought over China	Nature Communications
Yue et al. (2018)	Spatial association between landslides and environmental factors over Guizhou Karst Plateau, China	Journal of Mountain Science
Zhang et al. (2015a)	GAMLSS-based nonstationary modeling of extreme precipitation in Beijing–Tianjin–Hebei region of China	Natural Hazards
Zhang et al. (2018)	Impacts of compound extreme weather events on ozone in the present and future	Atmospheric Chemistry and Physics
Zhang et al. (2015b)	Aerosol Column Size Distribution and Water Uptake Observed during a Major Haze Outbreak over Beijing on January 2013	Aerosol and Air Quality Research
Zhou et al. (2012)	Root Biomass Dynamics Under Experimental Warming and Doubled Precipitation in a Tallgrass Prairie	Ecosystems
Žurovec et al. (2017)	Quantitative Assessment of Vulnerability to Climate Change in Rural Municipalities of Bosnia and Herzegovina	Sustainability

Zuzani et al. (2019)	Examining trends of hydro-meteorological extremes in the Shire River Basin in Malawi	Physics and Chemistry of the Earth, Parts A/B/C

Table S2. Complete list of concepts tagged in the literature sample, number of occurrences, and frequency

Concept	**n**	**%**	**Concept**	**n**	**%**	**Concept**	**n**	**%**
Impact	73	36.5	Maximum	7	3.5	Short-term	2	1.0
Frequency	63	31.5	Widespread	7	3.5	Critical	2	1.0
Magnitude	57	28.5	Shift	7	3.5	Calamity	2	1.0
Disaster	49	24.5	Major change	6	3.0	Outlier	2	1.0
Hazard	47	23.5	Sudden	6	3.0	Radical	2	1.0
Intensity	43	21.5	Multiplicative	6	3.0	Striking increase	2	1.0
Severe	42	21.0	Abnormal	6	3.0	Surge	1	0.5
Threshold	37	18.5	Episode	5	2.5	Discrete	1	0.5
Catastrophic	37	18.5	Change	5	2.5	Massive	1	0.5
Rapid	29	14.5	Unpredictable	5	2.5	Destabilizing	1	0.5
Anomalous	38	14.0	Perturbation	5	2.5	Spike	1	0.5
Exposure	23	12.0	Exceptional	5	2.5	Unusual	1	0.5
Abrupt	18	9.0	Deviation	4	2.0	Atypical	1	0.5
Disturbance	15	7.5	Drastic	4	2.0	Traumatic	1	0.5
Dramatic	15	7.5	Nonlinearity	4	2.0	Creeping process	1	0.5
Extremes	15	7.5	Transition	4	2.0	Short-lived	1	0.5
Sensitivity	14	7.0	Serious	4	2.0	Unforeseen	1	0.5
Superlative	13	6.5	Unprecedented	4	2.0	Accident	1	0.5
Duration	11	5.5	Susceptibility	3	1.5	Time-window	1	0.5
Compounding	10	5.0	Pulse	3	1.5	Discontinuity	1	0.5
Exceedance	9	4.5	High-freq.	3	1.5	Surprise	1	0.5
Extreme event	9	4.5	Deadly	3	1.5	Stupendous	1	0.5
Freq-mag	8	4.0	Extraordinary	3	1.5	Monumental	1	0.5
Destructive	8	4.0	Torrential	3	1.5	Sporadic	1	0.5
Significant	8	4.0	Marked diff.	3	1.5	Outbreak	1	0.5
Crisis	7	3.5	Amplification	3	1.5	Peril	1	0.5
Sharp	7	3.5	Pronounced	3	1.5	Stressor	1	0.5
Devastative	7	3.5	Peak	2	1.0	Surprise	1	0.5
Rare	7	3.5	Short-term dev.	2	1.0	Stochastic	1	0.5
Persistence	7	3.5	Emergency	2	1.0	Exacerbate	1	0.5
Danger	7	3.5	Sequential	2	1.0	Dramatic growth	1	0.5
Threat	7	3.5	Cataclysm	2	1.0	Remarkable	1	0.5
Disruption	7	3.5	Minimum	2	1.0	Turning point	1	0.5
Shock	7	3.5	Interruption	2	1.0			
Uncertainty	7	3.5	Rate	2	1.0			

Table S3. Complete list of themes tagged in the literature sample, number of occurrences, and frequency.

Theme	n	%	Theme	n	%	Theme	n	%
Climate change	117	58.5	Cultural change	9	4.5	Refuge	2	1.0
Vulnerability	94	47.0	Capacity	9	4.5	Social cartography	1	0.5
Health & psych.	81	40.5	Systems	9	4.5	Migration (chemical)	1	0.5
Risk	77	38.5	Uncertainty	9	4.5	Emergent organizations	1	0.5
Industrialization & infrastructure	60	30.0	Acclimatization & tolerance	8	4.0	Security	1	0.5
Adaptation	57	28.5	Feedbacks	8	4.0	Extent	1	0.5
Populations	55	27.5	Change	7	3.5	Decreasing likelihood	1	0.5
Agriculture	51	25.5	Spatial context	7	3.5	Long distance dispersal	1	0.5
Human activity	50	25.0	Cycles	7	3.5	Bioaccumulation	1	0.5
Loss & damage	47	23.5	Sustainability	6	3.0	Distance effects	1	0.5
Management	42	21.0	Conflict	5	2.5	Energy use	1	0.5
Ecology & ecosystems	41	20.5	Water	5	2.5	Mixed effects	1	0.5
Climate & circulation	40	20.0	Pollution	4	2.0	Islands	1	0.5
Habitat destruction	39	19.5	Equilibrium	3	1.5	Long-range dependance	1	0.5
Resilience	36	18.0	Hot-spots	3	1.5	Relativity	1	0.5
Prediction	30	15.0	Disaster prevention	3	1.5	Equifinality	1	0.5
Trending extremes	28	14.0	Extreme value theory	3	1.5	Territoriality	1	0.5
Thresholds	25	12.5	Spectral analysis	3	1.5	Riskscape	1	0.5
Socio/politico/cultural context	24	12.0	Dynamical systems modelling	3	1.5	Characterizing extreme events	1	0.5
Early warning systems	22	11.0	Human agency	3	1.5	Litigation	1	0.5
Human-env. dynamics	22	11.0	Lagged effects	3	1.5	Counterfactuals	1	0.5
Mitigation	22	11.0	Archaeology	2	1.0	Deltas	1	0.5
Resource security	20	10.0	Fragility	2	1.0	Interdependency	1	0.5
Land use	18	9.0	Solar output	2	1.0	Inoperability input output model	1	0.5
Attribution	16	8.0	Decision theory	2	1.0	Recreation & tourism	1	0.5
Human perception	14	7.0	Non-stationarity	2	1.0	Return period	1	0.5
Response & recovery	13	6.5	Distribution	2	1.0	Crude oil spills	1	0.5
Scale	13	6.5	Extreme event stats	2	1.0	Relative & absolute definitions	1	0.5
Complex	12	6.0	Insurance	2	1.0	Causal cascade	1	0.5
Extinction & evolution	12	6.0	Environmental justice	2	1.0	Reference condition	1	0.5

Figure S1. PRISMA 2020 flow diagram (Page et al., 2021).

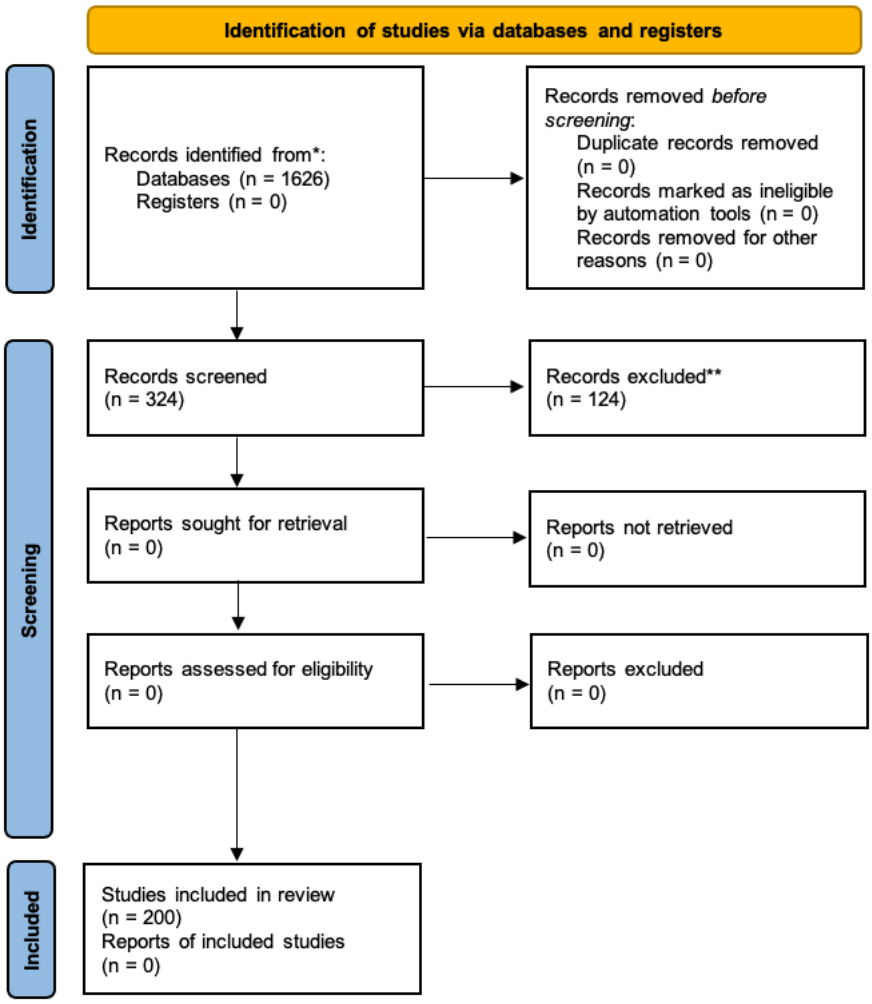


Figure S2. Collectors plots for concepts, themes, data types, and event types.

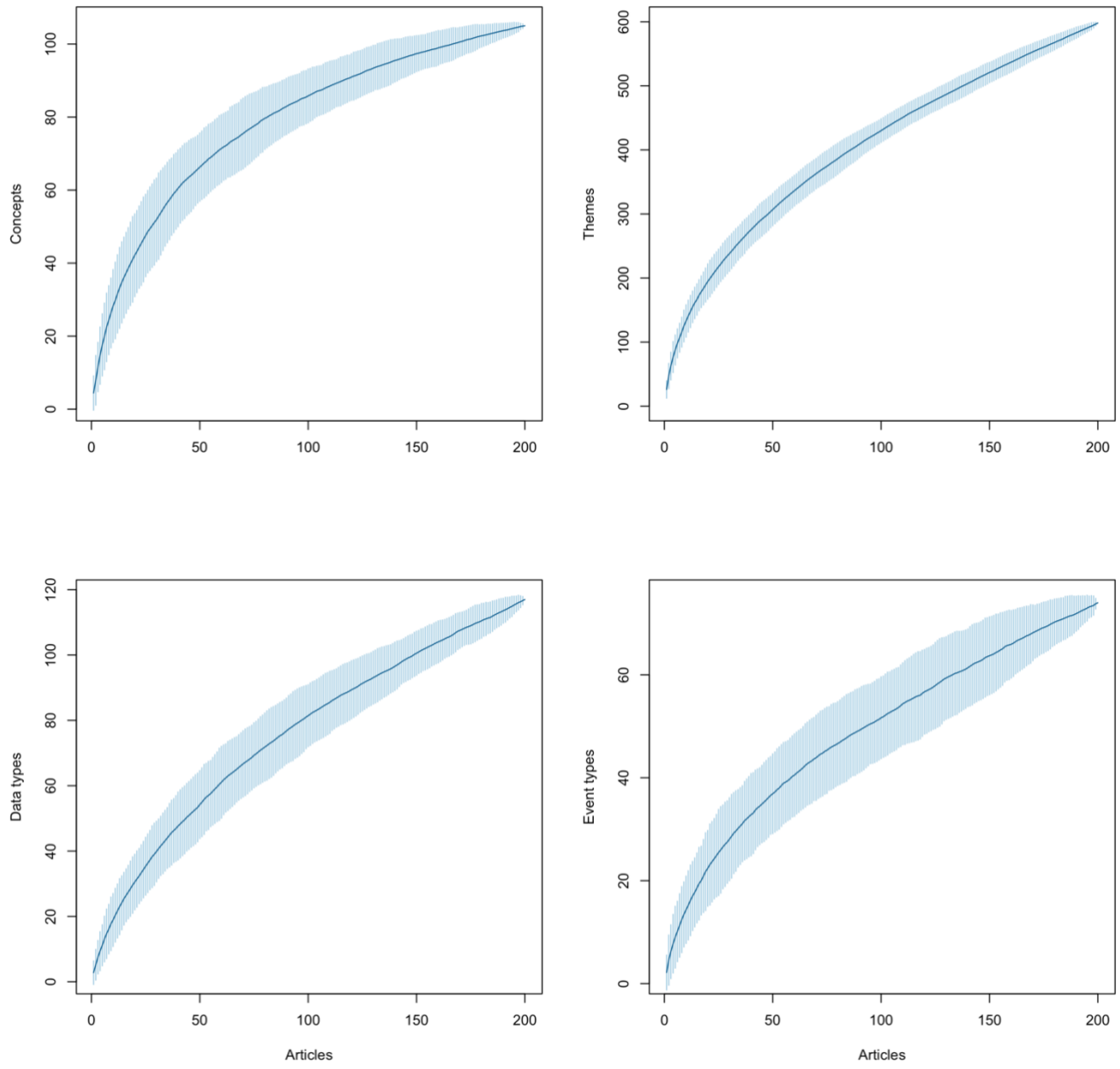
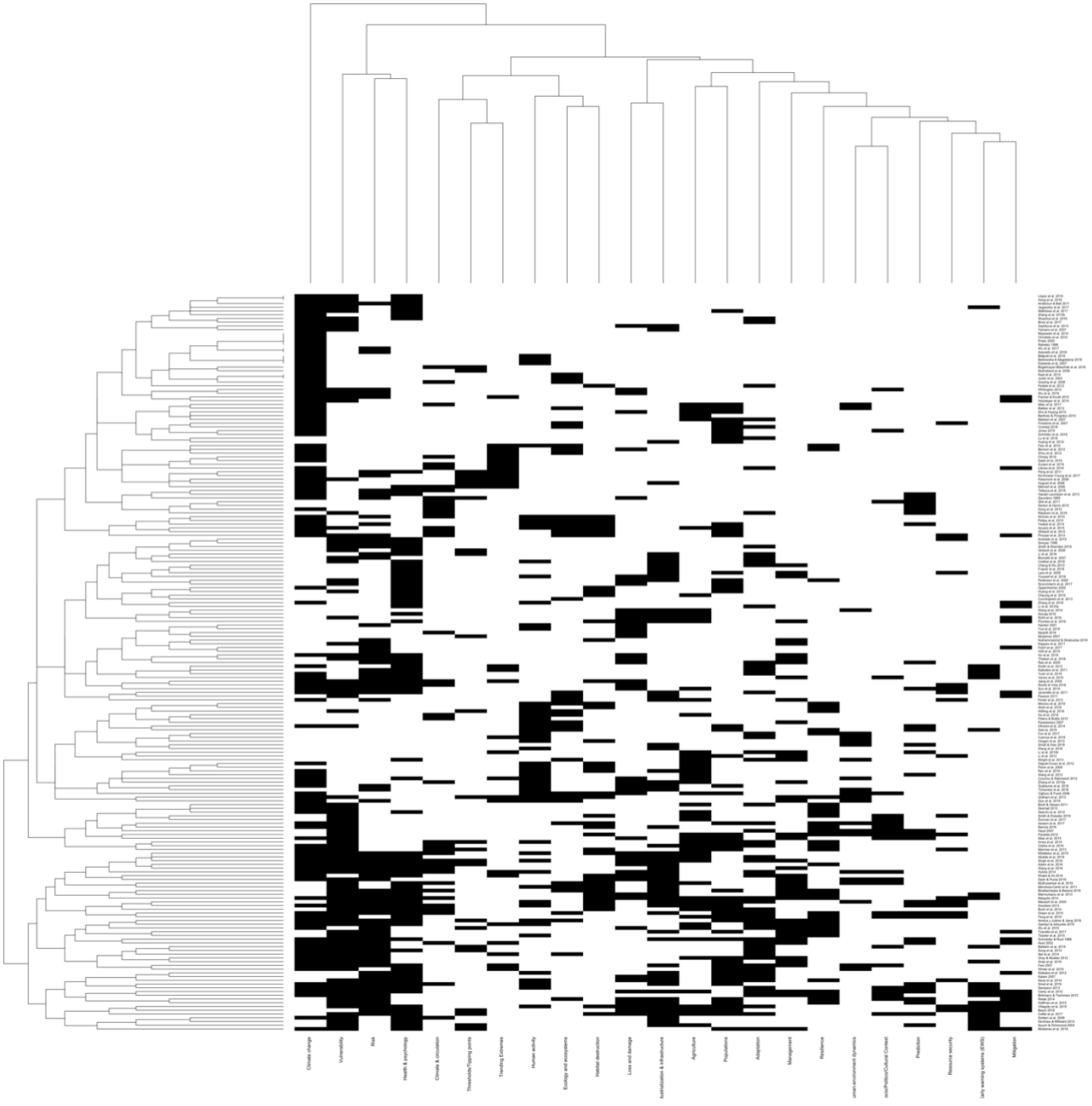


Figure S3. Heatmap showing paper likeness and theme clustering. Papers on the x-axis, and themes on the y-axis. Only the top 20 themes were used in this clustering analysis.



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