OXFORD QUICK REFERENCE

YOUR HANDY AND AUTHORITATIVE A-Z
GUIDE TO THE GEOGRAPHICAL SCIENCES

# Oxford

Geography

SUSAN MAYHEW

# A Dictionary of

# Geography

FIFTH EDITION

SUSAN MAYHEW





Great Clarendon Street, Oxford, OX2 6DP, United Kingdom

Oxford University Prèss is a department of the University of Oxford. It furthers the University's objective of excellence in research, scholarship, and education by publishing worldwide. Oxford is a registered trade mark of Oxford University Press in the UK and in certain other countries

© Susan Mayhew 1992, 1997, 2004, 2009, 2015

The moral rights of the author have been asserted

First published 1992 as *The Concise Oxford Dictionary of Geography*First edition (with Anne Penny) 1992
Second edition 1997
Third edition 2004
Fourth edition 2009
Fifth edition 2015

Impression: 1

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of Oxford University Press, or as expressly permitted by law, by licence or under terms agreed with the appropriate reprographics rights organization. Enquiries concerning reproduction outside the scope of the above should be sent to the Rights Department, Oxford University Press, at the address above

You must not circulate this work in any other form and you must impose this same condition on any acquirer

Published in the United States of America by Oxford University Press 198 Madison Avenue, New York, NY 10016, United States of America

British Library Cataloguing in Publication Data Data available

Library of Congress Control Number: 2014947483

ISBN 978-0-19-968085-6

Printed in Great Britain by Clays Ltd, St Ives plc

Links to third party websites are provided by Oxford in good faith and for information only. Oxford disclaims any responsibility for the materials contained in any third party website referenced in this work.

# A Dictionary of **Geography**

Susan Mayhew is a geography teacher and the author of Masterstudies Geography. Her current research interests are in feminist and historical geography and she is dedicated to the demystification of her favourite subject.

# SEE WEB LINKS

For recommended web links for this title, visit www. oxfordreference.com/page/geog when you see this sign.



# The most authoritative and up-to-date reference books for both students and the general reader.

Irish History

Accounting Animal Behaviour Archaeology Architecture and Landscape Architecture Art and Artists Art Terms Arthurian Literature and Legend Astronomy Battles Bible Biology Biomedicine British History British Place-Names Business and Management Card Games Chemical Engineering Chemistry Christian Art and Architecture Christian Church Classical Literature Computing Construction, Surveying, and Civil Engineering Cosmology Countries of the World Critical Theory Dance Dentistry Ecology Economics Education English Etymology English Grammar English Idioms English Literature **English Surnames** Environment and Conservation Everyday Grammar Film Studies Finance and Banking Foreign Words and Phrases Forensic Science Geography Geology and Earth Sciences Hinduism Human Geography **Humorous Quotations** 

Islam Iournalism Kings and Queens of Britain Law Enforcement Linguistics Literary Terms London Place-Names Mathematics Marketing Mechanical Engineering Media and Communication Medical Modern Poetry Modern Slang Music Musical Terms Nursing Opera Characters Philosophy Physics Plant Sciences Pocket Fowler's Modern English Usage Political Quotations Politics Popes Proverbs Psychology Quotations Quotations by Subject Reference and Allusion Rhyming Rhyming Slang Saints Science Scottish History Shakespeare Social Work and Social Care Sociology Statistics Synonyms and Antonyms Weather Weights, Measures, and Units Word Origins Zoology

Many of these titles are also available online at www.oxfordreference.com

# How to use this book

This dictionary provides coverage in one volume of the terms used in both human and physical geography. There are over 3,100 definitions across the following fields: cartography, surveying, remote sensing, statistics, meteorology, climatology, biogeography, ecology, simple geology, soils, geomorphology, population, migration, settlement, agriculture, industry, transport, development, and diffusion.

Headwords are printed in bold type and appear in alphabetical order. However, some entries contain further definitions. These have been included under the headword to avoid unnecessary repetition and to indicate some of the wider applications of the headword. Many terms have been marked with an asterisk. This points the reader to cross-references. In a very few cases the cross-reference as indicated does not have the exact wording as in the entry, but is close enough to make further reference possible.

References to geographical authors include surname, initials, and date. The use of these details in a card or electronic library catalogue will yield the book referred to.

Most journals are easily identifiable by their abbreviations, less simple abbreviations include:

AAAG Annals of the Association of American Geographers

ESPL Earth Surface Processes and Landforms

TIBG Transactions of the Institute of British Geographers

To find recommended web links for this title, visit www.oxfordreference.com/page/geog when you see this sign.



# Acknowledgement

I would like to thank my editor Jamie Crowther for his patience and understanding and Abigail Humphries Robertson, my production editor, for her moral support and humour during difficult times.



aa See BLOCK LAVA.

abiotic Not living, non-biological, usually describing factors in an ecosystem: atmospheric gases, humidity, salinity, soil mineral particles, water, and so on. An abiotic environment is one without any life. M. Gray (2003) argues that abiotic diversity is valuable, but threatened by human agency, which can destroy, damage, or pollute physical systems.

ablation Loss of snow and ice from a glacier by \*sublimation, melting, and evaporation; and from the \*calving of icebergs, and avalanches. In temperate and subpolar regions melting is the major form of ablation; in the Antarctic, it is calving. The rate of loss varies with air temperature, relative humidity, wind speed, insolation, aspect, and the nature of the surface. In snowfields, ablation includes snow removed by the wind, and is affected by aspect, depth of snow, and the nature of the underlying surface.

The ablation sub-system, where annual ablation exceeds annual accumulation, lies between the \*firn line and the glacier snout. Where ablation occurs at the edges of glaciers, debris accumulates to form ablation moraine/ablation till. An ablation valley is a subsidiary valley formed beneath the crest of a lateral moraine and the valley side. Iturrizaga (2001) Geogr. J. 54 notes that 'true ablation valleys' can result from differences in \*insolation, and may act in the development of lateroglacial moraine valleys.

aborigine A member of an indigenous people existing in a land before invasion or colonization from outside. For Canadian aboriginal peoples, see *Atlas of Urban Original Peoples*; for Australian, the Aboriginal Environments Research Centre, U. Adelaide; for Bolivian, Denevan (1966) *Nat. Tech. Info. Service*.

abrasion Also known as corrasion, this is the grinding away of bedrock by fragments of rock which may be incorporated in ice (\*glacial abrasion), water (marine abrasion, \*fluvial abrasion), or wind (\*aeolian abrasion). In fluvial environments, the main agent of abrasion is the \*bed load. The mass of solid material removed varies with the size, density, and velocity of the particles, and the density of the vector carrying these particles. See Sklar and Dietrich (2004) Water Resour. Res. 40 on a model for bedrock abrasion.

# ( SEE WEB LINKS

 For Sklar on the efficiency of particle abrasion in rivers.

absolute humidity The density of the water vapour present in a mixture of air and water vapour. Cold air cannot contain as much water vapour as warm air, so has a lower absolute humidity than warm air. Low absolute humidity results in more evaporation than in air with high absolute humidity. See also

absolute plate motion The movement of a crustal plate in relation to a abstraction 2



fixed point, such as a hot spot, or latitude and longitude.

### SEE WEB LINKS

- · Has an absolute plate motion calculator.
- Shows an absolute plate motion calculator.

**abstraction** The selection and conceptualization of a phenomenon, or some aspect of it; a way of viewing a real world object, usually a simplification—such as a \*model. **Data abstraction** captures the essential information needed to describe a spatial phenomenon and is fundamental in \*geographic information science.

See Smaalen in M. J. Kraak and M. Molenaar, eds (1996) for a hierarchical rule for geographic information abstraction. McCormack (2012) *PHG* 36, 6, 715, argues that 'abstraction can be affirmed as a necessary element of understandings of lived worlds in the making'.

**abundance** The total number of individuals of a certain species present in an area, generally estimated by sampling methods (such as capture-recapture), and which may vary according to competition, predation, and resources.

An **index of abundance** is a relative measure of the size of a population or sub-unit of the population, such as a year-class. The abundance, for example, of fish may be measured as number/weight of fish caught per standard unit of fishing effort, in a given area, and for a given time span, and then compared to earlier data. See Goel et al. (2012) *CIM-SiM*, for models of species abundance in \*biogeography.

**abyssal, abysso-** Of or belonging to the ocean depths, especially below 2000 m. The **abyssopelagic zone** is that part of deep lakes, oceans, or seas characterized by specific forms of plankton and nekton which inhabit open water, and the **abyssobenthic zone** is the bottom of a deep lake, ocean, or sea.

An abyssal plain is the deep sea-floor, formed of abyssal deposits, with a gradient of less than 1 in 10000. The Canada Abyssal Plain, lying between Canada and the Alpha ridge, is the largest of the Arctic sub-basins, with an average depth of 3658 m. Abyssal hills, which interrupt an abyssal plain, are 50–250 m high.

**accelerator** A factor which increases the momentum of a boom or slump in an economy, so that a small change in demand, for example, may lead to a greater industrial growth (or decline).

### SEE WEB LINKS

 Has an interesting map of growth acceleration in Britain.

access Connection or entry to a service. A. Sen (1999) measures access to advantage by one's access to basic needs: satisfying goods—like food; freedoms—as in a labour market; and capabilities. S. W. Allard (2004), in an examination of access to social services in three American cities, finds that poor populations in urban centres generally have greater spatial access to social services than poor populations in the suburbs.

accessibility The ease of approach to one location from other locations; in terms of the distance travelled, the cost of travel, or the time taken. The improvement of infrastructures produces an increase in accessibility that positively affects the competitiveness of the economic system and favours the appearance of specialization benefits and scale economies. In fact, regions with high levels of accessibility to the locations of input materials and markets tend to be more productive and competitive than peripheral and remote regions; see Gutiérrez in R. Kitchin and N. Thrift, eds (2009). Accessibility also refers to the ability to connect with information, knowledge, and people.

Topological accessibility is measured in relation to a system of nodes and paths (transportation network), assuming that accessibility is significant only to specific elements of a transport system, such as airports or ports. Contiguous accessibility is a measurable attribute of every location, as space is considered in a contiguous manner. See Miller and Wu (2000) GeoInformatica 4, 2 on \*GIS software for space-time accessibility measures.

Physical accessibility is the spatial separation of people from the supply of goods and services; see, for example, Orcao and Diez-Cornago (2007) Area 39, 3 on physical access to health services in Spain, and Gage and Calixte (2006) Pop. Studs 60, 3 on maternal health services in Haiti. Social accessibility is the ability of an individual to reach a resource or location, as affected by class structures, income, age, educational background, gender, or race. See Parks (2004) Econ. Geog. 80, 2 on social accessibility in Los Angeles, and the UK Transport Studies Group's Social Accessibility Mapping Project.

accordant Complying with; thus, accordant drainage has evolved in conformity with the underlying geological structure: domes show a radial pattern, for example. The law of accordant junctions (Playfair's law) states that tributaries join a stream or river at the same elevation as that of the larger watercourse; there is no sudden 'drop' in the level of the tributary, which is therefore \*graded to the level of the junction. See Niemann et al. (2001) ESPL 26, 12 for a quantitative evaluation of Playfair's law. Accordant summits are hill or mountain tops of approximately the same elevation, whose presence has been seen as confirmation of the cycle of erosion theory (Ojany (1978) Geo. J. 2, 5).

accreting margin See CONSTRUCTIVE MARGIN.

accretion 1. The growth of land by the offshore deposition of sediment, forming \*spits and \*tombolos. Accretion is most active in \*estuaries, particularly within the tropics. See Robin et al. (2007) U. Caen Coastal Morphodynamics Gp. on \*swash bar and hook spit formation.

- The increase in size of a continent by the addition of accretion terranes.
- **3.** The growth of a landform by the addition of deposits; \*seif dunes grow by accretion. See H. S. Edgell (2006).
- **4.** The increase in size of particles by additions to the exterior, as in the formation of \*hailstones. See Zheng and List (1995) *Procs Conf. Cloud Phys.*

acculturation The adaptation to, and adoption of, a new culture. This may occur simultaneously as two cultures meet, but occurs more often as an immigrant group takes to the behaviour patterns and standards of the receiving group. A major example is acculturation among African Americans; see H. Landrine and E. Klonoff (1996), and Sclemper (2007) *J. Hist. Geog.* 33, 2 on acculturation at the regional scale.

accumulated temperature One of the key factors for crop growth, this is the length of time, from a specific date, for which mean daily temperatures have been above, or below, a stated temperature; the total time for which temperatures varied from that standard.

accumulation 1. The input of ice to a glacier. Weaver (1975) Arct. & Alpine Res. 7, 3 suggests that it is greatest in shaded uplands. The accumulation zone (accumulation sub-system) is between the source and the \*firn line, where the input of snow, firn, and ice exceeds \*ablation. For snowfall in an accumulation zone to emerge as ice at the glacier snout takes about 100 years (Tuffen et al. (2002) Sed. Geol. 149).

2. The reinvestment of surplus value, in the form of capital, in order to increase that capital. Accumulation is a key feature of \*capitalism because, in order to remain in business, capitalists have not only to preserve the value of their capital, but to add to it. 'The accumulation of [a] firm's net worth determines the growth rate of capital and the growth rate of the economy' (Chatelain (2004) Econ. Letts. 85). D. Harvey (1982) argues that the obligatory accumulation of capitalism has fostered \*uneven development. Somel (2004) ERC W. Paper 0411 argues that the terms of trade between North and South help maintain a gap in capital accumulation. See also Hart-Landsberg and Burkett (2006) Hist. Materialism 14, 3 on China and the dynamics of transnational accumulation.

Smith's views on accumulation and phases of capitalist development (2005, *Hist. Materialism* 13, 4) are contested by O'Brien (2007) *Hist. Materialism* 15, 1. See Holden et al. (2011) *Geografiska B* 93, 2, 141 on accumulation by dispossession.

acidification A soil-forming process whereby organic acids (from humus) increase hydrogen ion concentration, as in the transformation of \*brown-earth soils into acid brown earth, in humid temperate forest regions. For the Model of Acidification of Groundwaters in Catchments (MAGIC), see Cosby (1995) Hydrol. & Earth Sys. Scis 2, 4. See Eidukeviciene et al. (2010) Nat. Hazards Earth Syst. Sci. 10, 1477 on effective soil acidification management.

acid rain When \*fossil fuels are burned, dioxides of sulphur and nitrogen are released into the air; these dissolve in atmospheric water to form acid rain. In addition, nitrogen oxides combine with volatile organic compounds to form ground-level smog. These pollutants lead to the acidification of lakes and

streams (making some of them incapable of supporting aquatic life), impair visibility, weaken forests, and degrade buildings.

Thermal power plants in India, which generally use coal with relatively high sulphur content (0.5 to 3%), are the major source of oxides of sulphur-they release about 2500 tons per year. Oxides of nitrogen are produced during hightemperature combustion. The greatest source of nitrogen oxides is road vehicles. Sing and Madhoolika Agrawal (2008) I. Enviro. Biol. 29, 1, 15, have a useful article, available online. In China, sulphur dioxide emissions from coal combustion are a primary contributor to acid rain. By the mid-1990s, an estimated 19% of the agricultural land in seven provinces (Jiangsu, Zhejiang, Anhui, Fujian, Hunan, Hubei, and Jiangxi) in southern China has been affected by sulphur dioxide and acid rain; the average decrease in crop yield attributable to the combined effects of SO2 and acid rain was 4.3% (S. K. Guttikunda et al. 2004). Oxides of sulphur and nitrogen may also be 'exported'; more than half of Taiwanese acid rain is from mainland China (Govt. Info. Office. Rep. China (Taiwan)). However, the UK Environment Agency and the US Environmental Protection Agency both record sharp falls in atmospheric sulphur dioxide.

acid soil Soil with a pH under 7, such as \*podzols and \*brown earths. Acidity in a soil may be due to the \*leaching out of cations when \*precipitation exceeds \*evapotranspiration. Other factors include the nature of the vegetation (and thus the \*humus) and of the parent rock. Adams and Evans (1989) Eur. J. Soil Sci. 40, 3 propose a model of soil acidification.

action research (participatory action research) A collaborative research process whereby people with a

particular issue work with academics: it seeks to democratize knowledge production and foster opportunities for empowerment by those involved' (Kindon, Pain, and Kesby [2008] in International Encyclopedia of Human Geography). An excellent example is provided by Young and Barrett (2001) Area 33, 2, 141, who examine the use of four 'action' methods for eliciting and acting upon information from street children in Kampala. In comparison with \*activist research, action research is guided by a pragmatic, problem-solving approach, and is not necessarily underpinned by radical politics.

action space (activity space) The area in which an individual moves and makes decisions about her or his life. Wong and Shaw (2011) *J. Geog. Syst.* 13, 2, 127 use this concept to assess segregation in south-east Florida, and include statistical methods of determining activity space. A useful and powerful paper.

active layer A highly mobile layer, periodically thawing, located above the \*permafrost in \*tundra regions, and ranging in depth from a few centimetres to 3 m. Its thickness depends on slope angle and aspect, drainage, rock and/or soil type, depth of snow cover, and ground-moisture conditions; clearing vegetation will increase the depth and mobility of the active layer. See Zhang et al. (2006) Nat. Snow & Ice Data Center on active layers in the Russian Arctic, and M. Lecki (2006). The mobility of the active layer is due to the tundra vegetation, which scarcely binds it together, so that it moves on slopes as gentle as 2°. Thawing may occur daily or only in summer; on refreezing, the active layer may expand, especially if \*silt-sized particles predominate.

\*Periglacial processes in the active layer include \*frost heaving, \*frost thrusting, \*ice wedging, \*gelifluction, and the formation of \*patterned ground. See THERMOKARST.

active margin Also called Pacific margin, this is a type of destructive \*plate margin characterized by \*ocean trenches, \*earthquakes, andesitic \*volcanic chains, and young \*fold mountains (Schellart and Lister (2005) Earth & Planet. Sci. Lett. 231).

**active volcano** A volcano known to have erupted in recent times, or which is likely to erupt. Examples include Mt Etna, Sicily; see Behncke et al. (2004) *Geomorph.* 63, 3–4.

activist research A method of collaborative, self-reflective problem-solving in a community context with academic geographers using their position and expertise to influence events beyond the university world. L. Hunt, E. Emerald, and G. Martin (2013) 'provide an all-inclusive road map to generating and implementing politically active grass-roots research activities'. See ACTION RESEARCH.

#### actor-network theory (ANT)

Focusing primarily on the actor—human or nonhuman, individual or group, conscious or unconscious-this theory explores the interconnectedness of all things. ANT recognizes that all objects and things exhibit consciousness, and through a consciousness, interact heterogeneously in space; the location of the interaction(s), where they are performed homogeneously, is the landscape. If, as ANT promotes, all objects and things exhibit consciousness, then the closer in space they are to one another, the more essential they are to each other (Allen (2011), Area 43, 3, 274). The basis of every action and decision depends on the actor's subjective interpretations, which are made and mutually adjusted in interaction with others. Jóhannesson and Bærenholdt

actualism 6

(in N. Thrift and R. Kitchin 2009) clarify that 'the ANT approach should be understood as a theory of what to study rather than an interpretive framework of the world'. See Sheehan (2011) *Area* 43, 3, 336 on ANT as a reflexive tool. For a clear demonstration of the application of ANT to a geographical topic, see Bosco in S. Aitken and G. Valentine (2006), pp. 200–201.

actualism The supposition that no biological and geological processes other than those operating today have operated in the past. However, H. G. Reading (1978) observes that 'the majority of past environments differ in some respects from modern environments. We must therefore be prepared, and have the courage, to develop nonactualistic models, unlike any that exist today'.

adaptive environmental

management A management strategy that emphasizes the use of environmental feedback in planning strategies. 'The recommended means for continuing ecosystem management and use of natural resources, especially in the context of integrated natural resource management. Conceptually, adaptive management is simply learning from past management actions to improve future planning and management. However, adaptive management has proved difficult to achieve in practice' (C. Allan and G. H. Stankey, eds, 2009).

adaptive radiation The diversification of species to fill a wide range of ecological \*niches. Perhaps the most famous example is that of Darwin's finches in the Galapagos Islands: see K. T. Grant and G. B. Estes (2009). Kassen et al. (2004) *Nature* 431, 7011 argue that the ecological gradient may limit the size of adaptive radiations.

adiabat A line plotted on a thermodynamic diagram, usually on a \*tephigram, showing as a continuous sequence the temperature and pressure states of a parcel of air with changing height. An adiabatic change is a change in temperature, pressure, or volume, involving no transfer of energy to or from another material or system. In an adiabatic process, compression is accompanied by warming, and expansion by cooling. An adiabatic temperature change thus results from a pressure change. The speed at which the temperature of rising air falls with altitude is the adiabatic lapse rate. Dry, rising air expands with height. The energy needed for this expansion comes from the air itself in the form of heat.

The resulting change in temperature is expressed in the equation:

$$\frac{dT}{dz} = \frac{-g}{Cp}$$

where dT is the temperature change, g is the acceleration due to gravity, dz is the height change, and Cp is the specific heat of the air parcel. This change is the **dry adiabatic lapse rate** (DALR): 9.84 °C/1000 m. The temperature change sustained by any parcel of dry air is calculated using Poisson's equation. If the rising air becomes saturated to

\*dew point, condensation of vapour will

begin. This condensation is accompa-

nied by the release of \*latent heat, which partly offsets the cooling with height, so that the rate of cooling of moist air—the **saturated adiabatic lapse rate** (SALR)—is lower than the DALR. In the lower \*troposphere, the vapour content of air is high so the latent heat of condensation is high; SALRs may be as low as 5 °C/1000 m. In the cold, dry, high troposphere, though, there is little vapour ready for condensation, so the SALR may be close to the DALR. Quantitative expressions of the SALR

are therefore quite complex. See B. Haurwitz (2007).

**adsorption** In \*soil science, the addition of ions or molecules to the electrically charged surface of a particle of clay or humus. In this way, minerals become bonded to soil particles (M. Ashman and G. Puri 2002). An **adsorption complex** is an 'organic and inorganic substance in soil that can absorb ions or molecules' (K. Peverill et al. 1999).

advanced capitalism A key feature of advanced capitalism is the possession of capital by fewer and fewer owners.

M. Castells (2002) stresses the fundamental importance of collective consumption in advanced capitalism. See R. Hernandez (2002) on the mobility of workers under advanced capitalism.

advanced economy (economically advanced economy) 'A term used by the International Monetary Fund (IMF) for the top group in its hierarchy: advanced economies, countries in transition, and developing countries. It includes: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, South Korea, Luxembourg, Netherlands, NZ, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, UK, and USA' (CIA (2007) World Factbook, appendix B). The IMF also includes Cyprus and Slovenia (IMF (2007) WEO Groups & Aggregates Info.).

advection The 'horizontal transport of energy and mass by parcels of air in convective flow systems' (Sivertsen (2007) EMS7/ECAM8 Abstracts 4). In meteorology, the term usually means the horizontal transfer of heat. Advective transfers occur in air streams, ocean currents, and surface \*run-off, partly redressing the \*insolation imbalance

between the tropics and the poles. For advection fog, see FOG.

**aeolian** Of the wind: aeolian processes include erosion, transport, and deposition, and work best with sparse, or absent vegetation. Baas (2007) *Geomorph*. 91, 3–4 describes aeolian sand transport as 'a classic dissipative process with nonlinear dynamics'. **Aeolian landforms** include desert \*zeugen and \*yardangs. See I. Livingstone, ed. (1998).

aeration zone The zone between the soil-moisture zone and the capillary zone, just above the water-table, which acts as a dispenser and buffer in the infiltration of groundwater flow (Diankov and Nitcheva (2005) *Bulgarian.*Acad. Scis). See also Sobotovich et al. (1991) Atom. Energy 70, 6 on the reduction of groundwater contamination since Chernobyl, 1986.

**aerobic** Describing any living organism which depends on atmospheric oxygen to release energy from foodstuffs during respiration. *Compare with* ANAEROBIC.

aerological diagram A chart plotting the factors which determine the movement of air. Variations of temperature, pressure, dry and saturated \*adiabatic lapse rates, and \*saturated mixing ratio lines are plotted against height in a \*tephigram. An adiabatic chart may be used to predict the \*convective condensation level.

**aerosol** A suspension of droplets or particles in a gas; more precisely, of particles with a maximum diameter of 1  $\mu$ m (\*fog and \*mist are thus aerosols). In meteorology, the term is often used to describe the particles suspended within the air, such as minute fragments of seasalt, dust, organic matter, and smoke. These enter the atmosphere by natural processes such as vulcanicity, and by human agency such as burning \*fossil

affect 8



fuels. Aerosols have a role in the radiative forcing of climate; they can absorb and scatter both infrared and solar radiation in the atmosphere; and they can affect and change the processes that control cloud and precipitation formation through their role as condensation nuclei. See I. T. Houghton, Y. Ding, and D. I. Griggs, et al. (2001) on aerosols and climate change. NASA posts a daily global aerosol map on the web.

affect Some consider that affect describes a process of change within a person; this person is affected and can affect. However, Thrift (2004) claims that 'there is no stable definition of affect': and Bondi (2009) Int. Encycl. Hum. Geog. 446, describes affect as a 'feeling, disposition, or mood that exists prior to cognition or rational thought. Often referred to as a mental state, affect is also bodily or sensory and unconscious or nonconscious in character. To be affected is to feel or to be touched or moved'. Shouse (2005) MC J. 8, 6 explains that 'feelings are personal and biographical, emotions are social, and affects are prepersonal'in other words, affect is our unconscious response which precedes our conscious feelings and decisions. 'The importance of affect'. Shouse explains, is that 'in many cases the message consciously received may be of less import to the receiver of that message than his or her non-conscious affective resonance with the source of the message'. See Thrift (2004) Geografiska B 86, 1 and Ash and Thrift (2005) Antipode 37. Pile (2010) TIBG 35, 1, 5 reviews affectual geography and is not impressed; read the conclusion to his paper.

**afforestation** Planting trees. Treeplanting can stabilize soils by increasing \*interception and reducing \*run-off, reduce flooding through the reduction of silting, improve soil fertility, and provide timber and firewood. See Zhang et al. (2007) Indus. Rept. 1/07, eWater CRC.

aftershock A smaller tremor or series of tremors occurring after an \*earthquake. Aftershocks result from static stress changes and 'dynamic' stresses (transient, oscillatory stress changes), that can weaken faults. Such dynamically weakened faults may fail after the seismic waves have passed, and might even cause earthquakes that would not otherwise have occurred (Kilb et al. (2003) Nature 408). See also Johnson et al. (2008) Nature 451. See Abe and Suzuki (2012) Acta Geophysica 60, 3, 547 on aftershocks in modern perspectives.

**age dependency** The dependency of people too young or too old to be employed full-time on the contributions of those in full employment. 'The actual dependency burden is determined not just by the sizes of the various functional age groups, but also by a host of social, cultural, and institutional factors' (Yap et al. (2005) *J. Cross-Cult. Gerontol.* 20, 4).

ageing, geographies of Spatial variations in demographic ageing, and the distribution of the elderly at local, regional, and national scales, are key issues in geographies of ageing: see the United Nations Population Division World Population and Ageing: 1950–2050 (2001) and Ferry et al. (2006) EPRC on variations within the EU.

Mulder (2007) Pop. Space & Place 13, 4 notes that when elderly people change residence they more often move closer to their children than further away. 'However, adult children changing residence move towards or away from their parents equally frequently.' See also Williams et al. (2000) Tourism Geog. 2, 1 on international retirement migration.

Sunley (2000) TIBG 25, 4 reports a north-south divide in income and benefit take-up among pensioners in the UK. with lower private pension coverage in low-income areas. 'The social status of people throughout life is reflected in the way their deaths are perceived and in the practices concerned with their dying' (Lloyd (2004) Ageing & Soc. 24, 2).

**agency** The capacity of the individual to act independently: a capacity that is meaningful, and has both intent and purpose. Clearly, the degree of agency each individual can exert varies with social class and geographical location, and these variations are a major concern for human geographers; see, for example, Plummer and Sheppard (2006) *Econ. Geog.* 6, 5, 619, or Herbert (2000), *PHG* 24, 4, 550.

The agency-structure debate refers to the relative merits of agency and \*structure—the relative importance of social structure or human agency—in producing particular outcomes. From the early 1980s, human geographers sought to move beyond this 'structure versus agency' impasse by citing A. Giddens (1984), who provided logical arguments for taking agency and structure equally seriously.

Social structures and human agency are interpenetrated and mutually determined. 'Structures provide human agents with a limited horizon of capabilities and possibilities, but those structures only exist in everyday practices' (Herbert, 2000). Cumbers et al. (2011, Antipode 42, 46) deplore the tendency of scholars to consider only capital and state actors. 'There is little sense of agency for individuals and communities . . . they are usually treated as passive victims of deeper underlying processes. In this paper, our purpose is to highlight the autonomy and agency of workers, people and communities in old industrial cities.

**Agenda 21** A set of proposals, made at the 1992 UN Conference on Environment and Development, Rio de Janeiro, to promote \*sustainable development. It sets out environmental strategies for managing coasts, oceans, and water, monitoring and reducing chemical waste, eradicating radioactive waste, and conserving natural vegetation and soils (through sustainable farming). Other proposals include measures to improve health care, reduce poverty, and develop fair and environmentally friendly trade policies. The aim is to promote global sustainable development at a more fundamental level than traditional aid programmes, based on common needs and interests. The requirement is for local governments to develop their own 'Local Agenda 21' in order to promote and implement sustainable development.

### SEE WEB LINKS

· Agenda 21 online.

agent An entity which can take a role; a function, service, or identity. Müller (2007) Area 39, 2 calls the geographer 'an active agent who moulds the production of meaning'. Bondi (2005) Antipode 37, 3 holds that neoliberalism envisages people as autonomous, individualized, selfdirecting, decision-making agents, 'Interdependencies between agents are constrained by social and spatial structure, but, over time, structure and agency are mutually constituted' (Plummer and Sheppard (2006) J. Econ. Geog. 6). The term 'agent-based model' refers to 'a broad class of computational models known also as "multi-agent models". As the name suggests, the model consists of a number of different "agents" that represent real-world entities such as households, businesses, individuals, and so forth. Each agent follows a set of relatively simple rules (an algorithm) controlling its interactions with other adjacent agents and its immediate environment over time' (Green (2013). TIBG 38, 1, 2).

a

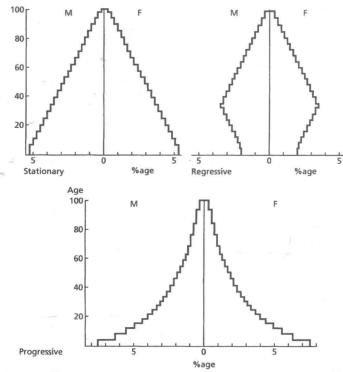
age-sex pyramid A set of two histograms set back to back on a vertical axis, depicting the numbers of the two sexes by age group. In many less developed countries the pyramid will have a very wide base; these are termed progressive pyramids because they suggest future population growth. Regressive pyramids characteristic of advanced economies, where there are fewer children and more old people, are more cylindrical; population is likely to fall.

**age structure** The composition of a nation by age groups. The age structure of the UK population has become older, the median age rising from 34.1 years in

1971 to 38.4 in 2003 and projected to rise to 43.3 in 2031 (*UK National Statistics*). Europe, with more than 15% of the population over 60, suffers from \*age dependency, while South Asia, with 45–55% of its population under 16, is concerned to limit population growth. See AGE—SEX PYRAMID.

**agglomerate** A coarse-grained volcanic rock, made of sharp/sub-angular lava fragments, set in a fine matrix. Some are \*pyroclastic; others are deposits from \*mud flows or \*lahars.

**agglomeration 1.** Within a geographical area, a concentration of economic activity brought about by, among



Age-sex pyramid

others, \*external economies (such as a pool of skilled labour), economies of scale, \*cumulative causation, local authority planning, and chance. 'The agglomeration of economic activities is a phenomenon as old as cities themselves' (E. Soja 2000). Phelps and Ozawa (2003) PHG 27, 5 distinguish between protoindustrial, industrial, and post-industrial agglomerations, with no common, formative processes underlying each. Pflüger and Südekum (2008) J. Econ. Geog. 8, 1 believe that agglomeration processes depend on specific technical properties; Roos (2005) I. Econ. Geog. 5, 5 claims that the influence of geography on agglomerations is small: 'at most, ~36% of the total variation can be explained by the effects of geography'. Fan and Scott (2003) Econ. Geog. 79, 3 find a strong positive relationship between spatial agglomeration and productivity in China. See Feldman in G. Clark et al., eds. (2000).

**2.** In meteorology, the process by which cloud droplets grow by assimilating other droplets.

**agglomeration economies** For an industry, the benefits of locating in a densely peopled and highly industrialized situation, where the market is large, but spatially concentrated. Transport costs are thus low, and specialized industries can evolve, since local demand is high. Further benefits arise because of \*functional linkages and \*external economies. See Park (2002) AI & Soc. 16, 3 on a Swedish Science Park which has intensified knowledge generation by facilitating technical innovation, education, and research.

Roos (2005) *J. Econ. Geog.* 5, 5 claims that the effect of agglomeration economies is over five times larger than the effects of geography, while Viladecans-Marsal (2004) *J. Econ. Geog.* 4, 5 shows that, in Spain, agglomeration economies influence the location of manufacturing

activity. 'Empirical analyses often find that factor endowments are more powerful in accounting for trade and production patterns than are agglomeration economies, but that both are important' (Hanink and Cromley (2005) *AAAG* 95, 3).

**aggradation** The deposition of unconsolidated deposits by \*aeolian, marine, or \*fluvial processes, when the quantity or calibre of the load is greater than the competence of the transporting medium to carry it, or as a result of \*mass movement. See Daniels (2003) *Geomorph.* 56, 3–4 on aggradational \*pedogenesis on floodplains. For aggradation surface, see Wang and Grapes (2008) *Geomorph.* 96, 1–2.

**aggregate** A group of soil particles held together by electrostatic forces, \*polysaccharide gums, and \*cementation by carbonates and iron oxides.

aggregation A way of combining a collection of very large datasets into classes, both to make subsequent analysis simpler and to provide a more generalized account of a phenomenon. For any analyses based on areal units, the problem is one of \*scale: that plotting geographical information on the wrong scale can conceal information that only becomes apparent at other scales and resolutions. Openshaw (1977) TIBG 2, 4, 459 offers a closely argued mathematical inquiry into this problem and suggests a solution to it; his conclusion is important to statisticians and non-statisticians alike: 'geographers and other spatial disciplines should pay far more attention to the way in which they design their zoning systems for spatial study'.

**aggressivity** In \*karst geomorphology, the ability of water to dissolve calcium carbonate. See Stafford et al. (2008) *Int. J. Speleol.* 37, 2.