

ENV-4010Y Geographical Perspectives

This module is organised by Professor Andrew Lovett. Dr Tom Hargreaves, Dr Nem Vaughan, Dr Martin Mahony, Dr Amii Harwood, Dr Katy Appleton and Professor Jason Chilvers will also be involved in teaching classes during the year.

[View Online](#)



1.

Matthews JA, Herbert DT. Geography: a very short introduction [Internet]. Oxford: Oxford University Press; 2008. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=415337>

2.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from: <https://app.talis.com/textbooks/9781446206652>

3.

Clifford NJ, Cope M, Gillespie T, French S, editors. Key methods in geography [Internet]. Third edition. Los Angeles: SAGE; 2016. Available from:
<https://app.talis.com/textbooks/9781473908970>

4.

Dorling D, Lee C, Hennig B. Geography [Internet]. London: Profile Books; 2016. Available from: <https://ebookcentral.proquest.com/lib/uea/detail.action?docID=4012182>

5.

Kneale PE. Study skills for Geography, Earth and Environmental Science students [Internet]. Fourth Edition. London: Routledge, Taylor & Francis Group; 2019. Available from: <https://ebookcentral.proquest.com/lib/uea/detail.action?docID=5741677>

6.

Murphy AB. Geography: why it matters [Internet]. Cambridge, UK: Polity; 2018. Available from: <http://ebookcentral.proquest.com/lib/uea/detail.action?docID=5614125>

7.

Holt-Jensen A. Geography: history and concepts [Internet]. Fifth edition. Los Angeles: SAGE; 2018. Available from:
<https://app.talis.com/uea/player#/modules/60ed57b04098fd6a921a35bb/textbooks/60edb6e5023754480e43fa3d>

8.

Castree N, Rogers A, Sherman DJ. Questioning geography: fundamental debates [Internet]. Malden, MA: Blackwell Pub; 2005. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=243571>

9.

Dorling D, Lee C, Hennig B. Geography [Internet]. London: Profile Books; 2016. Available from: <https://ebookcentral.proquest.com/lib/uea/detail.action?docID=4012182>

10.

Hall T, Toms P, McGuinness M, Parker C, Roberts N. Where's the Geography department? The changing administrative place of Geography in UK higher education. *Area*. 2015 Mar;47(1):56–64.

11.

Lave R. Introduction to special issue on critical physical geography. *Progress in Physical Geography*. 2015 Oct 1;39(5):571–575.

12.

Matthews JA, Herbert DT. Geography: a very short introduction [Internet]. Oxford: Oxford University Press; 2008. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=415337>

13.

Ellis EC. Anthropocene: a very short introduction. First edition. New York: Oxford University Press; 2018.

14.

Lewis SL, Maslin M. The human planet: how we created the anthropocene. UK: Pelican; 2018.

15.

Ellis EC. Physical geography in the Anthropocene. Progress in Physical Geography. 2017 Oct;41(5):525–532.

16.

Brotton J. Great maps. London: Dorling Kindersley; 2014.

17.

Brotton J. A history of the world in twelve maps. London: Allen Lane; 2012.

18.

Dorling D, Fairbairn D. Mapping: ways of representing the world [Internet]. Harlow: Longman; 1997. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1460776>

19.

Crampton JW. Mapping: a critical introduction to cartography and GIS [Internet]. Chichester: Wiley-Blackwell; 2010. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=477872>

20.

Monmonier MS. How to lie with maps. Third edition. Chicago: The University of Chicago Press; 2018.

21.

Wood D, Fels J. The natures of maps: cartographic constructions of the natural world. Chicago: University of Chicago Press; 2008.

22.

Harley JB. Chapter 1.8 Deconstructing the map [in] The Map Reader. The map reader: theories of mapping practice and cartographic representation [Internet]. Chichester: Wiley-Blackwell; 2011. p. 56–64. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=693305>

23.

Political Cartography: From Bertin to Brexit. Cartographic Journal [Internet]. 2016; Available from:
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=117954551&authtype=sso&custid=s8993828&site=eds-live&scope=site>

24.

Aitken SC, Valentine G, editors. Approaches to human geography: philosophies, theories, people and practices [Internet]. Second edition. Los Angeles: SAGE; 2015. Available from:
<https://app.talis.com/uea/player#/modules/60ed57b04098fd6a921a35bb/textbooks/60edb1f3023754480e43f9ad>

25.

Boyle M. Human geography: a concise introduction [Internet]. Chichester, West Sussex: Wiley-Blackwell; 2015. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1780036>

26.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1099465&a>

mp;authtype=sso&custid=s8993828&site=ehost-live&scope=site

27.

Cresswell T. Geographic thought: a critical introduction [Internet]. Chichester, West Sussex, UK: Wiley-Blackwell; 2013. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1120605>

28.

Gregory D. The dictionary of human geography [Internet]. 5th ed. Malden, MA: Blackwell; 2009. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=437431>

29.

Cloke PJ, Crang P, Goodwin M. Introducing human geographies [Internet]. 3rd ed. Abingdon: Routledge; 2014. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1524169>

30.

Chorley RJ. Socio-economic models in geography [Internet]. Haggett P, editor. Abingdon, Oxon: Routledge; 2013. Available from:
<http://ebookcentral.proquest.com/lib/uea/detail.action?docID=1474858>

31.

Chorley RJ, Haggett P, Chorley RJ. Physical and information models in geography: parts I, II, and V of Models in geography [Internet]. London: Methuen; 1969. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?milDocID=530601>

32.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1099465&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

33.

Cresswell T. Geographic thought: a critical introduction [Internet]. Chichester, West Sussex, UK: Wiley-Blackwell; 2013. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1120605>

34.

Dockerty T, Lovett A. A Location-centred, GIS-based Methodology for Estimating the Potential Impacts of Climate Change on Nature Reserves. *Transactions in GIS*. 2003 Jun;7(3):345–370.

35.

Zeller, KAMcGarigal, KWhiteley, AR. Estimating landscape resistance to movement: a review. *LANDSCAPE ECOLOGY* [Internet]. 2012; Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edswh&AN=000305218000001&authtype=sso&custid=s8993828&site=ehost-live>

36.

Geospatial Analysis - spatial and GIS analysis techniques and GIS software [Internet]. Available from: <http://www.spatialanalysisonline.com/>

37.

Harris R, Jarvis C. Statistics for geography and environmental science [Internet]. Harlow, Essex, England: Pearson Education Limited; 2011. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1683559>

38.

O'Sullivan D, Unwin D. Geographic information analysis [Internet]. 2nd ed. Hoboken, N.J.: John Wiley & Sons; 2010. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=821914&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

39.

Longley P, Goodchild MF, Maguire DJ. Geographic information science & systems [Internet].

Fourth edition. Hoboken, NJ: Wiley; 2015. Available from:
https://app-knovel-com.uea.idm.oclc.org/web/toc.v/cid:kpGISSE001/viewerType:toc//root_slu:g:geographic-information-science?kpromoter=marc

40.

Lovett, AAFoxall, CDBall, DJCreaser, CS. The Panteg monitoring project: comparing PCB and dioxin concentrations in the vicinity of industrial facilities. JOURNAL OF HAZARDOUS MATERIALS [Internet]. 1998; Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edswh&AN=000075646300022&authtype=sso&custid=s8993828&site=ehost-live>

41.

Darnell, ARBarclay, JHerd, RAPhillips, JCLovett, AACole, P. Geographical information system approaches for hazard mapping of dilute lahars on Montserrat, West Indies. BULLETIN OF VOLCANOLOGY [Internet]. 2012; Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edswh&AN=000306586400005&authtype=sso&custid=s8993828&site=ehost-live>

42.

Harris R, Jarvis C. Statistics for geography and environmental science [Internet]. Harlow, Essex, England: Pearson Education Limited; 2011. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1683559>

43.

Agriculture in the United Kingdom 2015 [Internet]. Department for Environment, Food & Rural Affairs; 2016. Available from:
<https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2015>

44.

Andrew Jones. Economic globalization. In: Cloke PJ, editor. Introducing human geographies [Internet]. Third edition. Milton Park, Abingdon, Oxon: Routledge; 2014. Available from:
<https://ebookcentral.proquest.com/lib/uea/reader.action?docID=1524169&ppg=442>

45.

Dicken P. Global shift: mapping the changing contours of the world economy [Internet]. Seventh edition. Los Angeles: Sage; 2015. Available from:
<https://app.talis.com/textbooks/9781473911055>

46.

Barrett J, Peters G, Wiedmann T, Scott K, Lenzen M, Roelich K, Le Quéré C. Consumption-based GHG emission accounting: a UK case study. Climate Policy. 2013 Jul;13(4):451–470.

47.

Lenzen, MKanemoto, KMoran, DGeschke, A. Mapping the Structure of the World Economy. ENVIRONMENTAL SCIENCE & TECHNOLOGY [Internet]. 2012; Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edswhsc&AN=000307199800059&authtype=sso&custid=s8993828&site=ehost-live>

48.

Tukker A, Bulavskaya T, Giljum S, de Koning A, Lutter S, Simas M, Stadler K, Wood R. Environmental and resource footprints in a global context: Europe's structural deficit in resource endowments. Global Environmental Change. 2016 Sep;40:171–181.

49.

Agnew JA. The United States in the world-economy: a regional geography. Cambridge: Cambridge University Press; 1987.

50.

Augé M. Non-places: [an introduction to supermodernity] [Internet]. 2nd English language ed. London: Verso; 2008. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=7140681>

51.

Massey D. A global sense of place [in] Reading human geography: the poetics and politics of inquiry. Reading human geography: the poetics and politics of inquiry. London: Arnold; 1997.

52.

Cloke PJ, Crang P, Goodwin M. Introducing human geographies [Internet]. 3rd ed. Abingdon: Routledge; 2014. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1524169>

53.

Cresswell T. Place: an introduction [Internet]. Second edition. Chichester, West Sussex: Wiley Blackwell; 2015. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1780033>

54.

Harvey D. The condition of postmodernity: an enquiry into the origins of cultural change. Malden, Mass: Blackwell; 1990.

55.

hooks bell. Yearning: race, gender, and cultural politics [Internet]. New York: Routledge, Taylor & Francis Group; 2015. Available from:
<http://ebookcentral.proquest.com/lib/uea/detail.action?docID=1813115>

56.

Pred, Allan. Place as Historically Contingent Process: Structuration and the Time-Geography of Becoming Places. Annals of the Association of American Geographers, 6/1/1984, Vol [Internet]. 1984;74. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.2569284&authtype=sso&custid=s8993828&site=ehost-live>

57.

Seamon D. A geography of the lifeworld: movement, rest, and encounter [Internet]. London: Groom Helm; 1979. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=3569542>

58.

Tuan Y fu, Yi-Fu Tuan. Space and place: the perspective of experience [Internet]. London: Edward Arnold; 1977. Available from:
<http://ebookcentral.proquest.com/lib/uea/detail.action?docID=310154>

59.

Tuan Y fu. Topophilia: a study of environmental perception, attitudes, and values [Internet]. Morningside ed. New York: Columbia University Press; 1990. Available from:
<http://ebookcentral.proquest.com/lib/uea/detail.action?docID=3029399>

60.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1099465&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

61.

Schumm SA, Lichy RW. Time, space, and causality in geomorphology. American Journal of Science. 1965 Feb 1;263(2):110–119.

62.

Toomey, MAshton, ADPerron, JT. Profiles of ocean island coral reefs. 2013; Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edswhsc&AN=000323272400003&authtype=sso&custid=s8993828&site=ehost-live>

63.

Flood warning system and julhlaups - Eyjafjallajull | Articles | Icelandic Meteorological office [Internet]. Available from: <http://en.vedur.is/hydrology/articles/nr/2097>

64.

Summerfield MA. Global geomorphology: an introduction to the study of landforms [Internet]. Harlow: Prentice Hall; 1991. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1688955>

65.

Castree N, Rogers A, Sherman DJ. Questioning geography: fundamental debates [Internet]. Malden, MA: Blackwell Pub; 2005. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=243571>

66.

Chorley RJ, Haggett P, Chorley RJ. Models in geography. London: Methuen; 1967.

67.

Cui Y, Kump LR, Ridgwell AJ, Charles AJ, Junium CK, Diefendorf AF, Freeman KH, Urban NM, Harding IC. Slow release of fossil carbon during the Palaeocene–Eocene Thermal Maximum. *Nature Geoscience*. 2011 Jun 5;4(7):481–485.

68.

Foody GM. Geographical weighting as a further refinement to regression modelling: An example focused on the NDVI–rainfall relationship. *Remote Sensing of Environment*. 2003 Dec;88(3):283–293.

69.

Leeson, AA Shepherd, A Briggs, K Howat, I Fettweis, X Morlighem, M Rignot, E. Supraglacial lakes on the Greenland ice sheet. 2015; Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edswhsc&AN=000346513900018&authtype=sso&custid=s8993828&site=ehost-live>

70.

Digest of UK Energy Statistics (DUKES) [Internet]. Department for Business, Energy & Industrial Strategy; 2016. Available from:
<https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes>

71.

Chapter 1: Energy Primer - Chapter 1 - IIASA [Internet]. Available from:
<http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/Chapter1.en.html>

72.

IPCC Fifth Assessment Report - Climate Change 2013 [Internet]. Available from:
<http://www.ipcc.ch/report/ar5/wg1/>

73.

Castree N. Nature [Internet]. London: Routledge; 2005. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=254446>

74.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009.
Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1099465&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

75.

Fisher B, Naidoo R, Ricketts TH. A field guide to economics for conservationists.
Greenwood Village, Colorado: Roberts and Company Publishers; 2015.

76.

Cloke PJ, Crang P, Goodwin M. Introducing human geographies [Internet]. 3rd ed.
Abingdon: Routldge; 2014. Available from:
<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1524169>

77.

Harvey D. Justice, nature, and the geography of difference. Cambridge, Mass: Blackwell;
1996.

78.

UK National Ecosystem Assessment [Internet]. Available from:
<http://uknea.unep-wcmc.org/>

79.

Wood D, Fels J. The natures of maps: cartographic constructions of the natural world. Chicago: University of Chicago Press; 2008.

80.

Adams J. Risk [Internet]. London: UCL Press; 1995. Available from:
<http://ebookcentral.proquest.com/lib/uea/detail.action?docID=170351>

81.

Beck U. Risk society: towards a new modernity [Internet]. London: Sage Publications; 1992. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=53304&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

82.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1099465&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

83.

Fischhoff B. Risk Perception and Communication Unplugged: Twenty Years of Process1. Risk Analysis. 1995 Apr;15(2):137–145.

84.

Frewer L, Löfstedt R, Earthscan. The Earthscan reader in risk and modern society. London: Earthscan; 1998.

85.

O'Riordan T. Environmental science for environmental management [Internet]. 2nd ed. London: Prentice Hall; 2000. Available from:

<https://ebookcentral.proquest.com/lib/uea/detail.action?docID=1810462>

86.

Royal Society. Study Group to Review the 1983 Report on Risk Assessment. Risk: analysis, perception and management. London: Royal Society; 1992.

87.

Slovic, Paul. Perception of risk. 1987;236(4799). Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.1698637&authtype=sso&custid=s8993828&site=ehost-live>

88.

Thompson M, Ellis R, Wildavsky AB. Cultural theory. Boulder, Colo: Westview; 1990.

89.

Burawoy, Michael. 2004 ASA Presidential Address: For Public Sociology. American Sociological Review, 2/1/2005, Vol [Internet]. 2005;70. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.4145348&authtype=sso&custid=s8993828&site=ehost-live>

90.

Burgess, J. Follow the argument where it leads: Some personal reflections on policy relevant research. Burgess, J (2005) Follow the argument where it leads: Some personal reflections on policy relevant research [Internet]. Some personal reflections on policy relevant research. Transactions of the Institute of British Geographers; 2005;(2005). Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=ir00525a&AN=UEA.28967&authtype=sso&custid=s8993828&site=ehost-live>

91.

Castree, Noel. Border Geography. Area, 3/1/2002, Vol [Internet]. 2002;34. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.2004210&authtype=sso&custid=s8993828&site=ehost-live>

92.

Castree, Noel. Geography and Environmental Policy - Introduction. 2005;30(3). Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.3804403&authtype=sso&custid=s8993828&site=ehost-live>

93.

Chilvers J, Burgess J. Power Relations: The Politics of Risk and Procedure in Nuclear Waste Governance. Environment and Planning A. 2008 Aug;40(8):1881–1900.

94.

Clifford NJ. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1099465&authtype=sso&custid=s8993828&site=ehost-live&scope=site>

95.

Martin, R. Geography and public policy: the case of the missing agenda. Progress in Human Geography [Internet]. 2001;25(Issue 2):189–210. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=4650400&authtype=sso&custid=s8993828&site=ehost-live>

96.

Massey, D. The Progress in Human Geography lecture, Geography on the agenda. Progress in Human Geography [Internet]. 2001;25(Issue 1):5–17. Available from:
<http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=4369053&authtype=sso&custid=s8993828&site=ehost-live>

97.

Ward K. Geography and public policy: towards public geographies. Progress in Human Geography. 2006 Aug 1;30(4):495–503.

98.

Sauer CO, Leighly J. Chapter 16: 'The morphology of landscape' [in] Land and life: a selection from the writings of Carl Ortwin Sauer. Land and life: a selection from the writings of Carl Ortwin Sauer. Berkeley: University of California Press; 1963. p. 315–350.

99.

Matless D. The Anthroposcenic. *Transactions of the Institute of British Geographers*. 2017 Sep;42(3):363–376.

100.

Dolman PM, Lovett A, O'Riordan T, Cobb D. Designing Whole Landscapes. *Landscape Research*. 2001 Oct;26(4):305–335.

101.

Hoskins WG. The making of the English landscape. Paperback edition. Toller Fratrum, Dorset: Little Toller Books; 2013.

102.

Prager K. Agri-environmental collaboratives for landscape management in Europe. *Current Opinion in Environmental Sustainability*. 2015 Feb;12:59–66.

103.

Howard P. Spatial planning for landscape: mapping the pitfalls. *Landscape Research*. 2004 Oct;29(4):423–434.

104.

Landscape and Seascape Character Assessments [Internet]. Natural England; 2014. Available from:
<https://www.gov.uk/guidance/landscape-and-seascape-character-assessments>

105.

Council of Europe. European Landscape Convention [Internet]. Available from:
<http://www.coe.int/en/web/landscape/about-the-convention>

106.

Wylie, J. Landscape: Chapter 18. Introducing Human Geographies, Third Edition [Internet]. Abingdon: Routledge; 2014. Available from:
<http://ebookcentral.proquest.com/lib/uea/reader.action?docID=1524169&ppg=6>

107.

Clifford NJ. Chapter 15: 'Landscape: The Physical Layer'. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<https://app.talis.com/uea/player#/modules/60ed57b04098fd6a921a35bb/textbooks/60ed87f698ab2c30b3477cec#page-283>

108.

Clifford NJ. Chapter 16: 'Landscape: Representing and Interpreting the World'. Key concepts in geography [Internet]. 2nd ed. Los Angeles: SAGE; 2009. Available from:
<https://app.talis.com/uea/player#/modules/60ed57b04098fd6a921a35bb/textbooks/60ed87f698ab2c30b3477cec#page-304>

109.

Burgi M, Hersperger AM, Schneeberger N. Driving forces of landscape change - current and new directions. *Landscape Ecology*. 2005 Jan;19(8):857-868.

110.

Jesper Brandt, Primdahl J, Reenberg A. Rural land-use and landscape dynamics - analysis of 'driving forces' in space and time. 1999. p. 81-102. Available from:
<https://forskning.ruc.dk/en/publications/rural-land-use-and-landscape-dynamics-analysis-of-driving-forces>