

CURRICULUM VITAE

(October 2021)

Fischlin, Andreas (Dr. sc. nat., Prof. em. ETH Zurich)

Birth: December 2, 1949 in Bern, Switzerland

Married, two daughters

Languages: German, English, French



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Education

Dipl. Natw. ETH Biology, ETH Zurich, 1975 (with distinction)

Postgraduate Diploma Systems and Control Theory, ETH Zurich, 1979

Ph.D. Natural Sciences, ETH Zurich, 1982 (Doctor scientiae naturalis) (silver medal)

Professional Experience

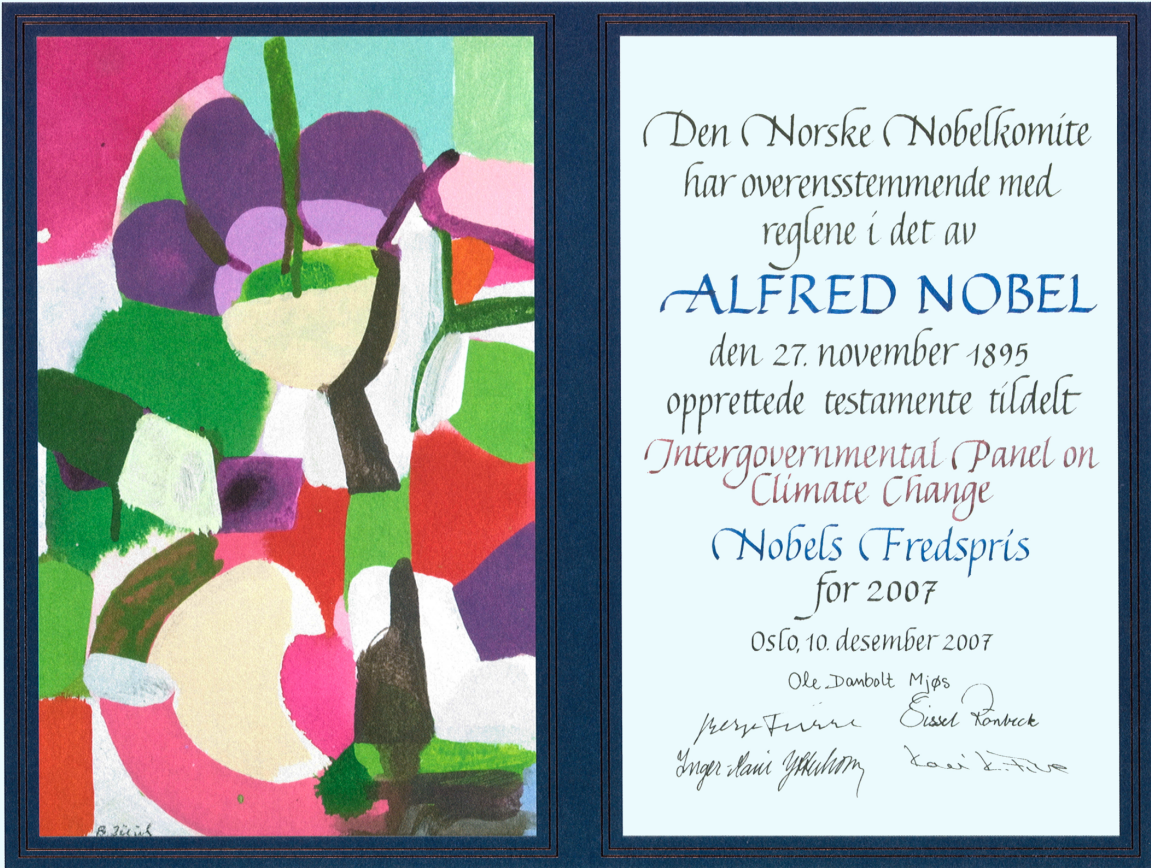
2015-to date	IPCC Vice-Chair Working Group II
1989-2015	Head of Terrestrial Systems Ecology ¹ , Dep. Environ. Systems Sciences, ETH Zurich
1996/97	Sabbatical leave at Northern Forestry Centre, Edmonton, Alta., Canada (M.Apps)
1988	Consultant for natural sciences (biology, agriculture, forestry, earth sciences), Project-Centre IDA (Informatik dient allen), ETH Zurich
1986-1988	Head pilot-project "Modelling and Simulation of Dynamic Systems - CELTIA", Institute of Control Theory and Industrial Electronics, ETH Zurich
1985-1986	Supervising assistant (Oberassistent), Institute of Phytomedicine and Institute of Control Theory and Industrial Electronics, ETH Zurich
1983-1985	Scientific contractor (Modelling and Management of Natural Resources) associated with the Maritimes Forest Research Centre of the Canadian Forest Service and the University of New Brunswick, Fredericton, N.B., Canada
1982-1983	Research associate at the Institute of Animal Resource Ecology, University of British Columbia, Vancouver, B.C., Canada
1981-to date	Lecturer of various courses (Lehraufträge) at ETH Zurich and University of Zurich in the fields of <i>Ecology</i> (Systems analysis (Ecological modelling), Insect, Quantitative, Global, and Systems Ecology etc.) and in <i>Systems Theory and Computer Sciences</i> (Modeling, Simulation with Scientific Work stations etc.)
1978	Visiting Scientist at the Maritimes Forest Research Centre, Department of Environmental Resources, Fredericton, N.B., Canada
1975-1980	Teaching Assistant, Institute of Entomology, ETH Zurich

Honours/Awards

- I3M/SESDE 2013 Best Paper Award (cf. Castro *et al.*, 2013)
- Nobel Peace Prize 2007 as awarded to the Intergovernmental Panel on Climate Change (IPCC) was presented to Andreas Fischlin for contributing to the award (next page)
- Denzler award 1989 of the Swiss Electrotechnical Association (SEV/ASE) for the competition on «Teaching Means in the Field of Electrical Engineering»
- Silver medal/prize for exceptional Ph.D. thesis, ETH Zurich

¹ www.sysecol.ethz.ch - www.sysecol.ethz.ch/people/afischli/

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- Diploma (M. Sc.) with distinction
 - see below section «Awarded Grants»



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



PRESENTED TO

ANDREAS FISCHLIN

FOR CONTRIBUTING TO THE AWARD OF THE

NOBEL PEACE PRIZE

FOR 2007 TO THE IPCC

R. K. Pachauri
IPCC Chairman

R. Christ
IPCC Secretary

Research Fields (Former and Present)

- Impacts of climatic change on ecosystems and bioclimatology
- Modeling of terrestrial ecosystems (forests, agroecosystems)
- Population biology (insects, mammals)
- Integrated pest control (agronomy, forestry)
- Systems theory based modeling and simulation of environmental systems (structured ecological modeling)
- Modeling and simulation software, user interface design (scientific and educational computing)

MISSION (RESEARCH AND TEACHING)

The mission is to conduct research and offer teaching in following areas:

- Dynamics of terrestrial ecosystems in a changing environment. Emphasis is on modeling and simulation of environmental change impacts, notably future climate changes, in a physically consistent manner. This includes linking climate with ecological models via downscaling and bioclimatic scenario derivation for mountainous or boreal forest ecosystems and agroecosystems in a complex terrain such as the Alps.
- Structural and functional aspects of mountain and boreal forest ecosystems such as carbon sequestration or diversity maintenance as determined by the dynamics of key species (extended keystone hypothesis)
- Structured ecological modelling principles and simulation methodologies for complex ecosystems studied at various spatial and temporal scales (theoretical systems ecology)

Research conducted by the systems ecology group achieved following accomplishments:

- Tasks: Past, present, and future climate change impacts on ecosystems, in particular on forests; mitigation of green-house-gas emissions, in particular in forestry; statistical down-scaling for bioclimatic scenario generation in complex terrains such as the European Alps.
- Models: Development of state-of-the-art modular ecosystem models (e.g. FORCLIM and FORLAND), which are widely used in research and/or agricultural extension services, or which provided submodels now used in other models (e.g. YASSO, CO2FIX) being also in wide use.
- Theories and tools: Formalisms that support structured ecological modeling by integrating different model formalisms (e.g. DESS [Diff. equ. syst. spec.], SQM [Sequential Machines/Automata], and DEVS [Discrete event syst. spec.]). Interactive modeling and simulation tools (e.g. Easy ModelWorks, Modelworks, RAMSES, ISIS, and RASS).

Positions and Activities outside ETH Zurich

- Member of the Drafting Team, Intergovernmental Panel on Climate Change (IPCC), «Climate Change 2022: Synthesis Report» Summary for Policymakers and Synthesis Report
- Member of the Drafting Team, Intergovernmental Panel on Climate Change (IPCC), «Climate Change 2022: Impacts, adaptation and vulnerability » Summary for Policymakers
- Member of the Drafting Team, Intergovernmental Panel on Climate Change (IPCC), «IPCC Special Report on the Ocean and Cryosphere in a Changing Climate» (SROCC), Summary for Policymakers
- Vice-Chair Working Group II of the Intergovernmental Panel on Climate Change (IPCC)
- Member of the Swiss Delegation at the UNFCCC² negotiations as delegate of Swiss scientific community (since 1999 till 2015)
- Co-Facilitator of the Structured Expert Dialogue of the 2013-2015 Review of the UNFCCC (2013-2015)
- Member of the Drafting Team, Intergovernmental Panel on Climate Change (IPCC), Working Group II: «Climate change 2007: Impacts, adaptation and vulnerability», Summary for Policymakers
- Member of the Drafting Team, Intergovernmental Panel on Climate Change (IPCC), Working Group II: «Climate change 2007: Impacts, adaptation and vulnerability», Technical Summary
- Chairmain of the Natl. Committee «Scientific Committee on Problems of the Environment (SCOPE)»

²United Nations Framework Convention on Climate Change (www.unfccc.int)

- Member of the Natl. Committee «International Geosphere-Biosphere Program - A Study of Global Change (IGBP)»
- Member of the Swiss Natl. Research Committee «Scientific Research in the Swiss National Park (WNPk)» of Swiss Academy of Sciences
- Member of the Advisory Body on Climate Change (OcCC) by the Swiss Federal Department of Home Affairs and the Swiss Federal Department of the Environment, Transport, Energy and Communication (Etec) - www.occc.ch/

IPCC³ REPORTS (REFEREED)

Nobel Peace Prize 2007

- Parmesan, C., Mike D. Morecroft, Trisurat, Y., Adrian, R., Anshari, G.Z., Arneith, A., Gao, Q., Gonzalez, P., Harris, R., Price, J., Stevens, N., Talukdar, G.H., 2022. Terrestrial and Freshwater Ecosystems and their Services. Rev. eds.: Billini, C.F., Didukh, Y., & **Fischlin, A.** In: Pörtner *et al.*, (eds.). *Climate change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge University Press: Cambridge, UK and New York, NY, USA: in prep. (invited, refereed by hundred of reviewers)
- Costello, M.J., Vale, M.M., Kiessling, W., Maharaj, S., Price, J., Talukdar, G.H., 2022. Biodiversity Hotspots. Rev. ed.: **Fischlin, A.** In: Pörtner *et al.*, (eds.). *Climate change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge University Press: Cambridge, UK and New York, NY, USA: in prep. (invited, refereed by hundred of reviewers)
- IPCC & draft contributing authors including **FISCHLIN, A.**, 2019. IPCC Special Report on on the Ocean and Cryosphere in a Changing Climate (SROCC). In: Pörtner, H.-O., Roberts, D.C., Masson-Delmotte, V., Zhai, P., Tignor, M., Poloczanska, E., Mintenbeck, K., Nicolai, M., Okem, A., Petzold, J., Rama, B. & Weyer, N. (eds.). *IPCC Special Report on on the Ocean and Cryosphere in a Changing Climate (SROCC)*. IPCC with World Meteorological Organisation (WMO), and United Nations Environmental Program (UNEP), Geneva, Switzerland: [In press](#). (refereed by hundred of reviewers)
- Hock, R., Rasul, G., Adler, C., Cáceres, B., Gruber, S., Hirabayashi, Y., Jackson, M., Kääh, A., Kang, S., Kutuzov, S., Milner, A., Molau, U., Morin, S., Orlove, B. & Steltzer, H. & contributing authors including **Fischlin, A.**, 2019. High mountain areas. In: Pörtner, H.-O., Roberts, D.C., Masson-Delmotte, V., Zhai, P., Tignor, M., Poloczanska, E., Mintenbeck, K., Nicolai, M., Okem, A., Petzold, J., Rama, B. & Weyer, N. (eds.). *IPCC Special Report on on the Ocean and Cryosphere in a Changing Climate (SROCC)*. IPCC with World Meteorological Organisation (WMO), and United Nations Environmental Program (UNEP), Geneva, Switzerland: [In press](#). (invited, refereed by hundred of reviewers)
- Allen, M., Dube, O.P., Solecki, W., F.Aragón–Durand, Cramer, W., Aragón, F.–Durand, Cramer, W., Humphreys, S., Kainuma, M., Kala, J., Mahowald, N., Mulugetta, Y., Perez, R., Wairiu, M. & Zickfeld, K., 2018. Framing and context. Rev. eds.: Idris, I. E., **Fischlin, A.** & Gao, X. *Global warming of 1.5 °C - An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*: 49-91. <https://www.ipcc.ch/report/sr15/> (invited, refereed by hundred of reviewers)
- IPCC & editorial team including **Fischlin, A.**, 2018. Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Masson-Delmotte, V., Zhai, P., Pörtner, H.O., Roberts, D., Skea, J., Shukla, P.R., Pirani, A., Moufouma-Okia, W., Péan, C., Pidcock, R., Connors, S., Matthews, J.B.R., Chen, Y., Zhou, Z., Gomis, M.I., Lonnoy, E., Maycock, T., Tignor, M. & Waterfield, T. (eds.). *Global warming of 1.5 °C - An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. IPCC with World Meteorological Organisation (WMO), and United Nations Environmental Program (UNEP), Geneva, Switzerland: 541-562. <https://www.ipcc.ch/report/sr15/> (invited, refereed by hundred of reviewers)
- Settele, J., Scholes, R., Betts, R., Bunn, S., Leadley, P., Nepstad, D., Overpeck, J., & Taboada, M. A., 2014. Terrestrial and inland water systems. Rev. eds.: **Fischlin, A.**, Moreno, J. M. & Root, T. In: Field, C. B., Barros, V. R., Dokken, D. J., Mach, K. J., Mastrandrea, M. D., Bilir, T. E., Chatterjee, M., Ebi, K. L., Estrada, Y. O., Genova, R. C., Girma, B., Kissel, E. S., Levy, A. N., Maccracken, S., Mastrandrea, P. R., & White, L. L. (eds.). *Climate change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the*

³ Intergovernmental Panel on Climate Change (www.ipcc.ch) of the World Meteorological Organisation (WMO, www.wmo.ch) and the United Nations Environment Programme (UNEP, www.unep.org)

Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press: Cambridge, UK and New York, NY, USA: 271-359. (invited, refereed by hundred of reviewers)

FISCHLIN, A., MIDGLEY, G.F., Price, J.T., Leemans, R., Gopal, B., Turley, C., Rounsevell, M.D.A., Dube, O.P., Tarazona, J. & Velichko, A.A., 2007. Ecosystems, their properties, goods and services. M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden & C. E. Hanson (eds.), *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change (IPCC)*. Cambridge University Press, Cambridge, UK: 211-272. (invited, refereed by ca. 200 reviewers)
www.ipcc.ch/

ADGER, N. & coauthors including **FISCHLIN, A.**, 2007. Summary for policymakers. In: M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden & C. E. Hanson (eds.), *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change (IPCC)*. Cambridge University Press, Cambridge, UK: 7-22. (refereed by hundreds of reviewers)
www.ipcc.ch/

ADGER, N. & coauthors including **FISCHLIN, A.**, 2007. Technical summary. In: M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden & C. E. Hanson (eds.), *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change (IPCC)*. Cambridge University Press, Cambridge, UK: 23-78. (refereed by hundreds of reviewers)
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SCHLAMADINGER, B., BOONPRAGOB, K., JANZEN, H., KURZ, W., LASCO, R., SMITH, P., COLLAS, P., ABDALLA EL SIDDIG, E.N., **FISCHLIN, A.**, MATSUMOTO, M., NAKHUTIN, A., NOBLE, I., PIGNARD, G., SOMOGYI, Z. & ZHANG, X.-Q., 2003. *Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. In: PENMAN, J., GYTARSKY, M., HIRAISHI, T., KRUG, T., KRUGER, D., PIPATTI, R., BUENDIA, L., MIWA, K., NGARA, T., TANABE, K. & WAGNER, F. (eds.), *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Published by the Institute for Global Environmental Strategies (IGES) for the IPCC, ISBN 4-88788-003-0, Available from IPCC Secretariat or NGGIP (Also available on CD ROM), pp. 4.1-4.86. (invited, refereed by ca. 160 reviewers)
www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf_contents.htm

GITAY, H. *et al.* (including **FISCHLIN, A.** as review editor), 2001. Ecosystems and Their Goods and Services. In: McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J. & White, K.S. (eds.), *Climate change 2000 - Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel of Climate Change (IPCC)*. ISBN 0-521-80768-9 (hrdcov.) / 0-521-01500-6 (pbk.), Cambridge University Press, Cambridge a.o., 1032pp: (invited, refereed by ca.130 reviewers)
www.ipcc.ch/

WATSON, R. *et al.* (including **FISCHLIN, A.**), 1996. Climate change 1995: Impacts, adaptations and mitigation - Summary for Policymakers. *Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel of Climate Change*. Cambridge University Press: Cambridge a.o., 22 pp. (invited, refereed by ca.450 reviewers)
www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

KIRSCHBAUM, M. & **FISCHLIN, A.**, 1996. Climate change impacts on forests. In: Watson, R., Zinyowera, M.C. & Moss, R.H. (eds.), *Climate change 1995 - Impacts, adaptations and mitigation of climate change: scientific-technical analysis*. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel of Climate Change. ISBN 0-521-56431-X (hrdcov.) / 0-521-56437-9 (pbk.), Cambridge University Press, Cambridge a.o., pp. 95-129. (invited, refereed by ca.150 reviewers)
www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

REPORTS PREPARED FOR THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

FISCHLIN, A., Ji, Z., VLADU, F. & BISIAUX, A., 2015. Report on the Structured Expert Dialogue on the 2013-2015 Review of the United Nations Framework Convention on Climate Change (UNFCCC). Subsidiary Body for Implementation (SBI) and Subsidiary Body for Scientific and Technological Advice (SBSTA), [FCCC/SB/2015/INF.1](http://fccc/sb/2015/inf.1). 182pp.

PUBLICATIONS IN REFEREED JOURNALS

- ZOMMERS, Z., MARBAIX, P., **FISCHLIN, A.**, IBRAHIM, Z.Z., GRANT, S., MAGNAN, A.K., PÖRTNER, H.-O., HOWDEN, M., CALVIN, K., WARNER, K., THIERY, W., SEBESVARI, Z., DAVIN, E.L., EVANS, J.P., ROSENZWEIG, C., O'NEILL, B.C., PATWARDHAN, A., WARREN, R., AALST, M.V. & HULBERT, M., 2020. Burning Embers: Towards more transparent and robust climate change risk assessments. *Nature Reviews Earth & Environment*, **1**: 516-529. doi: [10.1038/s43017-020-0088-0](https://doi.org/10.1038/s43017-020-0088-0)
- SESARTIĆ, A., FISCHLIN, A. & TÖWE, M., 2016. Towards narrowing the curation gap - Theoretical considerations and lessons learned from decades of practice. *ISPRS Int. J. Geo-Inf.*, **5**(6): 91. doi: [10.3390/ijgi5060091](https://doi.org/10.3390/ijgi5060091)
- CASTRO, R. D., CELLIER, F. E., & **FISCHLIN, A.**, 2014. Sustainability analysis of complex dynamic systems using embodied energy flows: The eco-bond graphs modeling and simulation framework. *J. Comput. Sci.*, **10**: 108-125. doi: [10.1016/j.jocs.2014.10.001](https://doi.org/10.1016/j.jocs.2014.10.001)
- WARREN, R., PRICE, J., SANTIAGO DE LA NAVA, S., **FISCHLIN, A.** & MIDGLEY, G., 2010. Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise. *Clim. Change*, **106**(2): 141-177. doi: [10.1007/s10584-010-9923-5](https://doi.org/10.1007/s10584-010-9923-5)
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- FISCHLIN, A.**, 2008. Klimaschutz, das Kyoto-Protokoll und der Schweizer Wald e-Anhang. Elektronischer Anhang zum zugehörigen Artikel (*Schweiz. Z. Forstwes.*, 159(9): 258-266). doi: [10.3929/ethz-a-005649427](https://doi.org/10.3929/ethz-a-005649427)
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- Fuhrer, J., Beniston, M., **FISCHLIN, A.**, Frei, C., Goyette, S., Jasper, K. & Pfister, C., 2006. Climate risks and their impact on agriculture and forests in Switzerland. *Clim. Change*, **79**(1-2): 79-102. doi: [10.1007/s10584-006-9106-6](https://doi.org/10.1007/s10584-006-9106-6)
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- ROTH, O., DERRON, J., **FISCHLIN, A., NEMECEK, T. & ULRICH, M.,** 1992. Implementation and parameter adaptation of a potato crop simulation model combined with a soil water subsystem. *Systems Ecology Report*, No. 10, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology ETH, Zurich, Switzerland, 30pp. www.sysecol.ethz.ch/publications/reports/#10 (also published in critically revised form)
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For most of above cited works is an abstract or full text available at: www.sysecol.ethz.ch/publications or www.sysecol.ethz.ch/publications/reports

ALGORITHMS AND SOFTWARE PACKAGES MADE PUBLICLY AVAILABLE

Detailed information on algorithms and software packages summarized below can be found at www.sysecol.ethz.ch/ramses/.

MacMETH	A fast Modula-2 language system for the Macintosh from ETH ⁴
Dialog Machine	A platform independent graphical user interface for personal computers and workstations ⁵
Auxiliary Library	A collection of library modules useful in the context of programing, modeling, simulation, and scientific data analysis
Science Library	A collection of library modules useful in scientific applications such as bioclimatic scenario generation, complex statistical analysis, advanced modeling, or GIS algorithms

⁴This language system was mainly developed by Niklaus Wirth and his students from the Department of Computer Sciences at ETHZ. At the present it is supported by the Terrestrial Systems Ecology Group.

⁵Unless explicitly stated for a particular computer platform, the listed software is available for Macintosh, IBM PC, and Unix platforms

Easy ModelWorks	A simple interactive modeling and simulation environment for personal computers
ModelWorks	An interactive simulation environment for personal computers and workstations
ISIS	Integrative Systems Implementation Software supporting the implementation of complex dynamic systems in a hierarchical manner
RAMSES Shell	A tool supporting the tasks of programming, modeling, design of simulation experiments, simulation, and analysis of simulation results
RASS	The RAMSES Simulation Server supporting lengthy simulations in a batch mode, particularly on the Unix platform

Above listed software is available for download (freeware, courtesy ETH Zurich) at:
www.sysecol.ethz.ch/ramses/ link Downloads. Related reports:

- FISCHLIN, A., GYALISTRAS, D. & LÖFFLER, T.J.**, 2006. Installation Guide and Technical Reference of the RAMSES Software (Version 3) For Apple® Macintosh® Computers. A Technical Systems Ecology Report Version July 2006, Systems Ecology, ETH Zurich (Swiss Federal Institute of Technology), Zurich, Switzerland, 48 pp.
www.sysecol.ethz.ch/RAMSES/Documents/RAMSES_Install-Tech_Report.pdf
- FISCHLIN, A.**, 1994. MODELWORKS: An interactive simulation environment for personal computers and workstations. *Systems Ecology Report*, No.14, ITÖ-ETH Zurich, CH-8952 Schlieren, Switzerland, 324pp. www.sysecol.ethz.ch/publications/reports/#14
- WIRTH, N., GUTKNECHT, J., HEIZ, W., SCHÄR, H., SEILER, H., VETTERLI, C. & FISCHLIN, A.**, 1992. MacMETH. A fast Modula-2 language system for the Apple Macintosh. User Manual. 4th, completely revised ed. Department of Computer Sciences (ETH), Zürich, Switzerland, 116 pp.
www.sysecol.ethz.ch/SimSoftware/RAMSES/MacMETH.html#Wirth92
- FISCHLIN, A.**, 1986. Simplifying the usage and the programming of modern workstations with Modula-2: The 'Dialog Machine'. Internal report Project-Centre IDA, Swiss Federal Institute of Technology Zürich (ETHZ), Switzerland, 13 pp.

MISCELLENEOUS

- Ph. D. Thesis was reviewed in "Basic research in ecology - 1985". Annual research review by the Encyclopedia Britannica «Yearbook of Science and the Future» (p. 319-320).

TEACHING

Current Teaching

The educational goals of our current teaching efforts are (1 unit = 1h-lesson for the duration of a semester):

- a) For about 90 graduate students in Environmental Sciences (XB) and Biology (XA) (2 units: Ecosystems: Functions and Processes (for advanced students / Ökosysteme: Funktionen und Prozesse since 1999 (für Fortgeschrittene))):
 - introduces fundamental concepts of ecosystem processes, demonstrates their applicability to both terrestrial and aquatic ecosystems
 - illustrates methods for experimental and modeling approaches for investigating ecosystem processes
 - demonstrates how ecosystem concepts are applied at various spatial scales
 - addresses how human activities are modifying ecosystem processes and discusses approaches required for a sustainable utilization of ecosystems
- b) For about 12 master students (Master in Ecology and Evolution, Master in Biology) since 2007 (3 units: Systems Ecology: Principles and Modelling):
 - introduces techniques and applications of modeling and simulation of ecological systems
 - provides insight into selected concepts of systems analysis and theoretical systems ecology
 - demonstrates various modeling approaches and major results from recent research on terrestrial ecosystems
- c) For about 15 master students (Master in Ecology and Evolution, Master in Biology) since 2008 (2 units: Topics in Ecosystem Ecology):
 - introduces students to a set of advanced topics from ecosystem ecology
- d) For about 12 graduate students (various departments) since 2007 (3 units: Disciplinary professionalization with pedagogical focal point on environmental teaching/Fachwissenschaftliche Vertiefung mit pädagogischem Fokus Umweltlehre):
 - Scientific input on selected topics for students who learn to teach environmental sciences at the high-school level
- e) For graduate students and Ph.D. students
 - familiarize young scientists with professional tools (modeling, simulating, designing simulation experiments in conjunction with field research, interpreting results, writing) and with advanced techniques and approaches in theoretical systems ecology and terrestrial ecosystems research

Former Teaching (Lecturing (Lehraufträge) only)

Period	Course title	Units	Audience
1995 - 2006	<u>Systemökologie</u> <i>Systems Ecology</i>	2	ETHZ/D-UWIS XB,XA,XC,VI,VII,IX
1986 - 1991	<u>Quantitative Ökologie</u> <i>Quantitative Ecology</i>	2	ETHZ/XB
1988 - 1997	<u>Umwelt (Biosphäre)⁶</u> <i>Environment (Biosphere) - Global Ecology</i>	1	ETHZ/XB
1986 - 1991	<u>Insektenökologie</u> <i>Insect Ecology</i>	1	ETHZ/VII,XA
1986 - 1992	<u>Systemanalyse I (Allg. Systemtheorie)</u> <i>Systems Analysis I (General Systems Theory)</i>	1	ETHZ/VII,XA,XB
1986 - 1992	<u>Systemanalyse II (Naturwissenschaftliche Anwendungen)</u> <i>Systems Analysis II (Scientific Applications)</i>	1	ETHZ/VII,XA,XB

⁶not held for two winter terms during period 1993-1994

1981 - 1988	<u>Systemanalyse (Anwendungen in Biologie u. Landwirtschaft)</u> <i>Systems Analysis (Biological and Agricultural Applications)</i>	4	ETHZ ⁷ VII,XA
1981 - 1988	<u>Entwicklung von Unterrichtsprogrammen</u> <i>Development of Educational Programs</i>	1	UZH/CS
1985 - 1988	<u>Arbeitsplatzrechner und ihr Einsatz im Unterricht</u> <i>Work Stations and Their Usage in Education</i>	2	ETHZ/IIIB+all
1986	<u>Technisch- wissenschaftliches Arbeiten mit Personalcomputern</u> <i>Engineering and Scientific Working on Personal Computers</i>	~1	Swiss Industry
1986 - 1987	<u>Der Einsatz des Kleincomputers im Hochschulunterricht</u> <i>The usage of small computers in university teaching</i>	~1	UZHÐZ/all

ETHZ - Swiss Federal Institute of Technology Zurich, Zurich, Switzerland

UZH - University of Zurich, Zurich, Switzerland

IIIB - Electrical Engineering

VI - Forest Sciences

VII - Agriculture and Food Science

IX - Mathematics, Physics, and Computer Assisted Sciences

XA - Biology⁸

XB - Environmental Sciences

XC - Earth Sciences

CS - Computer Sciences

All lectures⁹ involved examinations of the students

Principal supervisor(*) or co-supervisor of the following Ph.D. theses:

VANCOSO-POLACSEK, K., 1990*. *Theory and practice of computer assisted simulation and modelling on professional workstations*. Diss. ETH No. 9104, Swiss Federal Institute of Technology, Zürich, Switzerland, pp. 109.

NEMECEK, T., 1993*. *The role of aphid behavior in the epidemiology of potato virus Y: a simulation study*. Diss. ETH No. 10086, Swiss Federal Institute of Technology, Zürich, Switzerland, pp. 232.

BUGMANN, H., 1994*. *On the ecology of mountainous forests in a changing climate: a simulation study*. Diss. ETH No. 10638, Swiss Federal Institute of Technology, Zürich, Switzerland, pp. 258.¹⁰

PERRUCHOUD, D., 1996*. *Modeling the dynamics of nonliving organic carbon in a changing climate: a case study for temperate forests*. Diss. ETH No. 11900, Swiss Federal Institute of Technology: Zürich, Switzerland, pp. 213.

GYALISTRAS, D., 1997*. *Projecting scenarios of climatic change and future weather for ecosystem models: derivation of methods and their application to forests in the Alps*. Diss. ETH No. 12065, Swiss Federal Institute of Technology, Zürich, Switzerland, pp. 103.

PRICE, B., 2006*. *Spatio-temporal modelling and analysis of larch bud moth population dynamics in the European Alps*. Diss. ETH No. 16423, ETH Zurich, Zürich, Switzerland, pp. 220.

TANNER, A., 2014. *Von Molekülen, Parasiten und Menschen - Alfred James Lotka und die Mathematisierung des Lebens*. Diss. ETH No. 21844, ETH Zurich (Swiss Federal Institute of Technology): Zürich, Switzerland. 337pp.

Involved in the supervision (as advisor and/or research project partner)

ISENEGGER, D., 2006. *IPODLAS - a framework for coupling temporal simulation systems, virtual reality, and Geographic Information Systems*. Ph.D. Thesis, University of Zurich, Zürich, Switzerland, pp. 240.

⁷not held summer term 1983

⁸occasionally students of mathematics, physics, biology, or earth sciences from ETHZ as well as UNIZ have also attended

⁹not the case for course offered to industry

¹⁰Silver medal/prize for exceptional Ph.D. thesis, ETHZ

- WU, Y., 2006. *Knowledge-based 4d visualization of amorphous phenomena in complex terrain*. PhD. Thesis University Zurich, Zürich, Switzerland, 134 pp.
- BERNHARD, L., 2007 (in prep.). *Influence of global change on the water cycle in forest ecosystems - a plausibility analysis*. Ph.D. thesis, University of Zurich, Zürich, Switzerland.

Supervisor of the following Master and term theses:

- ÖZTÜRK, Z. & KNIJNENBURG, R., 1987. *GAG - Ein Graphen-Editor und Programm-Generator*. Diplomarbeit Projektzentrum IDA/CELIA, Institut für Automatik, ETH: Zurich, Switzerland, 151 pp.
- ULRICH, M., 1987. *ModelWorks. An interactive Modula-2 simulation environment*. Post-graduate thesis Project-Centre IDA, Swiss Federal Institute of Technology (ETHZ): Zürich, Switzerland, 53 pp.
- BALTENSWEILER, M., 1988. *Modellierung pflanzlichen Wachstums bei Schadstoffbelastung: Mathematische Modelle zum Waldsterben*. Semesterarbeit in Systemanalyse Fachgruppe Systemökologie, ETH Zürich, Zurich, Switzerland, 50 pp.
- BLANKE, M., 1989. *Simulationsmodelle der Koexistenz von Pflanzenarten in Halbtrockenrasen*. Master thesis ETHZ (Swiss Federal Inst. of Technology), 103 pp.
- MARTI, F., BUGMANN, H. & WALLIMANN, K., 1989. *Auswirkungen eines Phosphorsäureesters (Insektizid Ekamet) auf die Planktonbiozönose des Greifensees*. Master thesis Diplomarbeit EAWAG & Fachgruppe Systemökologie, ETH Zürich, 232 pp.
- RECHSTEINER, H.U., 1993. *Einfluss des Verbisses durch Rothirsche (Cervus elaphus L.) auf die Etablierung von subalpinen Baumarten: Feldstudien und Modellierung*. Master thesis Swiss Federal Institute of Technology: Zürich, Switzerland, 102 pp.
- FISLER, J., 1998. *Klima und Gebirgswaldentwicklung entlang einem Höhengradienten - untersucht an einem Transekt im Dischmatal*. Master thesis Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology: Zurich, Switzerland, 70 pp.
- MÄDER, J., 1999. *Effekte externer Störungen auf den Sukzessionslauf subalpiner Wälder: Modellierung und Analyse*. Master thesis Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology: Zurich, Switzerland, 62 pp.
- ALTHERR, W., 1999. *Identifikation der Ortswahl bestimmenden Verhaltensparameter des Hirsches Cervus elaphus L. mittels Telemetriedaten aus dem Gebiet des schweizerischen Nationalparks*. Master thesis Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology: Zurich, Switzerland.
- KÜFFER, C., 2000. *Modellierung der Habitatsnutzung des Rothirsches Cervus elaphus L. im Gebiet des schweizerischen Nationalparks – Ein individuenbasierter Ansatz*. Master Thesis, Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology, Zurich, Switzerland.
- HAFNER, M., 2000. *Simulation studies with a forest patch model linked to downscaled transient GCM-scenarios*. Master Thesis, Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology, Zurich, Switzerland, 82 pp.
- PORRET, B.A., 2001. *Räumliche und zeitliche Vegetationsmodellierung auf subalpinen Weiden im Schweizerischen Nationalpark*. Master Thesis, Institute of Geography, University of Zurich & Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology (ETH Zurich), Zurich, Switzerland, 137 pp.
- GIORGETTA, F., 2002. *Integration von Raum und Zeit in ein Landschaftsanalyse- und Simulationssystem: Systemtheoretische Grundlagen und Evaluation gängiger Systemsimulationsprogramme*. Semesterarbeit No. D-ITET ETHZ, Systems Ecology, Institute of Terrestrial Ecology, Swiss Federal Institute of Technology, Zurich, Switzerland, 54 pp.
- BERGAMIN, J.P., 2004. *Schnelle Datenübertragung für verteilte Simulation und Visualisierung*. Master Thesis, Institute of Automatic Control, Swiss Federal Institute of Technology Zurich, Zurich, Switzerland, 42 pp.
- GARDI, O., 2005. *Analyse und Evaluation der RAMSES Software bezüglich Neuimplementation auf modernen OS X und UNIX/Linux Arbeitsplatzsystemen*. Technische Semesterarbeit, Systems Ecology, Institute of Terrestrial Ecology, ETH Zurich, Zurich, Switzerland, 159 pp.
- GARDI, O., 2006. *Effect of forest management regimes on the carbon budget of boreal spruce stands in the priluzje Leskhov, Russia*. Master Thesis, Systems Ecology, Institute of Integrative Biology: Ecology, Evolution, Infectious Disease, ETH Zurich, Zurich, Switzerland, 97 pp.
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Courseware (offered on the Internet also for continuing education)

Below listed courseware and reports are all available in electronic form at

www.sysecol.ethz.ch/CourseWare/

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DISSEMINATION AND OUTREACH

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AWARDED GRANTS

	Amount awarded (CHF)	
	Total ¹¹	Personal Share ¹²
Total received since Oct. 1989 up to present	CHF 5'305'187.–	CHF 3'450'680.–
Average per year ¹³	CHF ~300'000.–	CHF ~200'000.–

Awarded since Oct. 1989:

Funding agency	Project	Amount awarded (CHF)	
		Total ²	Personal Share ³
Swiss NSF	FORAGROCLIM: Workstation-assisted ecological modelling and simulation and the impact of climate change on ecosystems in an alpine region 1989-96	616'885.–	616'885.–
Swiss NSF (Swiss Priority Programme Environment)	FORCLIMSense: Alpine Forest Ecosystems in a Changing Climate- Paleoclimatic Model Validation and Sensitivity Analysis 1993-1995	296'130.–	296'130.–
Swiss NSF (Swiss Priority Programme Environment)	HEIDI: Case Studies in Bioclimatic Scenario Derivation 1993-1995	232'871.–	232'871.–
Swiss NSF (Swiss Priority Programme Environment)	SensuAlp: Sensitivity and uncertainty analyses of climate scenarios and ecosystem responses in the Alps - Part B1: Forest Ecosystems 1996-2000	307'926.–	307'926.–
Swiss NSF (Swiss Priority Programme Environment)	SensuAlp: Sensitivity and uncertainty analyses of climate scenarios and ecosystem responses in the Alps - Part B2: Agricultural Ecosystems 1996-2000	282'567.–	28'000.–
Swiss NSF	The population dynamics of grassland succession: 2000-2004	150'000.–	0.– ¹⁴
COST E21 ¹⁵ and SAFEL ¹⁶	Carbon Pools and Fluxes in Swiss Forests 2001-2005	488'800.–	162'934.–
SAFEL	Bestandesanalyse zum Thema CO ₂ -Senken in der Schweiz 1999-2004	283'632.–	283'632.–
Swiss NSF (Natl. Res. Programme)	Knowledge Based Dynamic Landscape Analysis and Simulation for Alpine	388'090.–	129'364.–

¹¹To all applicants including Andreas Fischlin as main or co-applicant

¹²To applicant Andreas Fischlin respectively Terrestrial Systems Ecology

¹³ Rounded to 100k CHF

¹⁴ The final awarded budget was so tight, that I declined to receive any share

¹⁵COST E21: Contribution of Forests and Forestry to Mitigate Greenhouse Effects (www.bib.fsagx.ac.be/coste21/). COST - European Cooperation in the field of Scientific and Technical Research

¹⁶Swiss Agency for the Environment, Forests, and Landscape (now FOEN, see below)

NRP48) ¹⁷	Environments (IPODLAS). 2002-2008		
SAFEL	Scenarios of climatic trends and extremes for forest modeling in the Alpine region (TREWALP). 2002-2006	150'000.–	75'000.–
Swiss NSF (NCCR ¹⁸ Climate)	Impacts of Climate Variability and Change On Swiss Forests and Potential Risks From Associated Biotic Feedbacks. 2003-2007	513'186.–	513'186.–
FOEN ¹⁹	Scientific Investigations on Climate Change (IPCC and UNFCCC). 2006-2008	159'000.–	159'000.–
FOEN	Science and Climate Change (UNFCCC). 2009	120'000.–	120'000.–
FOEN	Science and Climate Change (UNFCCC). 2010	40'000.–	40'000.–
CCEM-CH ²⁰	OptiControl - Use of Weather and Occupancy Forecasts for Optimal Building Climate Control. 2007-present (Total: 1,276,100.– / Personal share: 485,752.–)	193'350.–	182'752.–
Siemens Schweiz AG		153'000.–	153'000.–
swisselectric ²¹		929'750.–	150'000.–

¹⁷National Research Programme NRP48: Landscapes and Habitats of the Alps

¹⁸National Centers of Competence in Research - Climate: Climate Variability, Predictability and Climate Risks (www.nccr-climate.unibe.ch, www.snf.ch/E/targetedresearch/centres/currentNCCR/Seiten/_xc_nfsklima.aspx)

¹⁹ Federal Office for the Environment (www.bafu.admin.ch)

²⁰ Competence Centre for Energy and Mobility (CCEM-CH, <http://ccem-ch.web.psi.ch> and www.sysecol.ethz.ch/OptiControl)

²¹ www.swisselectric.ch