The International ENVIRONMETRICS Society - TIES

Newsletter

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Editors: Sylvia Esterby, Alessandro Fassò, Paul Sampson

In This Issue:

1. A Message from the President,

Anders Grimvall

TIES, ISI and the future meetings structure

During the ISI meeting in Sydney, the ISI General Assembly decided to offer TIES Section status. Nobody was against, and both the present and past presidents of the Executive Committee informed me that the decision had their full support. Hence, the ISI issue is back to TIES for a final round. The board is preparing a voting procedure in which all TIES members can say “yes” or “no” to the offer given by the ISI. If a strong majority is in favor, the board will take the necessary steps to change the status of TIES. If there is considerable opposition, TIES must consider alternative strategies for its future development.

Personally, I was skeptical to the first proposals from ISI, because TIES has strong ambitions to recruit members who have long been outside the community of statisticians that traditionally makes up ISI. However, the world is changing. ISI and many other learned societies have gradually become more open because the problems addressed are interdisciplinary. In addition, any organization, including TIES, needs to renew its strategies for the future. The trend in the attendance at TIES meetings has been negative and our organization is a key player in a relatively narrow field.

The main arguments pro and con joining ISI are well-known. As a section of ISI, TIES would no doubt become more "official". If this is exploited in a proper manner, TIES has a good chance to receive more publicity and to play a more active role in the public debate about environmental issues. Furthermore, the status of an ISI section may help us to a long needed increase of the membership. However, we should not underestimate the risks involved in the ISI project. Although TIES need not be dissolved to become an ISI section - formally, it is just a matter of changing the statutes – there may be undesirable indirect effects. ISI has a shrinking economy and the median age of its members is alarmingly high. In addition, some of the scientists we would like to see as TIES members may hesitate to join a section of an organization named "Statistical Institute"

Regardless of which arguments you have faith in, it would be detrimental to sit down and hope that the concept that once made TIES grow and prosper will be successful for ever. An interdisciplinary organization like TIES must always work actively to maintain and further develop its profile. In this context, I would welcome a discussion about a new meetings structure for TIES. In particular, I would like to have your opinion about a meetings structure with three types of events: 1) Major biannual meetings with themes that help to define what TIES stands for and that will also attract a broad group of participants representing several different sciences; 2) Methodological and applied sessions at the biannual ISI meetings and satellite conferences to these meetings; 3) Smaller and more specialized workshops that can help to strengthen the regional structure of TIES.

Anders Grimvall (angi@mai.liu.se)

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2. TIES News

2.1 New Members

Daniella Cocchi

Welcome to the new members who joined between Nov 2004 and April 2005.

Karaca, Farhat Turkey
Stein, Michael L. USA
Barabesi, Lucio ITALY

2.2 Member's News

Daniela Cocchi, TIES secretary, Professor of Statistics at the University of Bologna and Coordinator of the Italian Group of Environmental Statistics (GRASPA), has been elected President of the Italian Statistical Society for a four-year term. This happened, during the last societal general meeting held in Bari, June 2004. More information about the Italian Statistical Society can be found in http://w3.uniroma1.it/sis/.

International Statistical Institute (ISI) membership elections announced in the second round for 2004 included current TIES President **Anders Grimvall**, Linköping University, Sweden, and long-time TIES member **Armand Maul**, Université de Metz, France.

News from the ISI General Assembly in Sydney: **Jozef L. Teugels**, Katholieke Universiteit Leuven, Belgium, was awarded an ISI service certificate and, **Abdel El-Shaarawi**, National Water Research Institute, Canada was elected to ISI Council for the term 2005-2009.

TIES President-Elect, **David Brillinger**, University of Califonia-Berkeley was chosen the 18th Pfizer Colloquium presenter in the Department of Statistics, University of Connecticut-Storrs. The Pfizer Colloquium, *A Journey through Random Process Data Analysis: One Type to the Next*, was videotaped on November 12, 2004 under the auspices of Filming of Distinguished Statisticians for the Archive of the American Statistical Association. *A Conversation with David Brillinger* was also videotaped with William H. Williams, Hunter College CCNY and Kjell Doksum, University of Wisconsin-Madison, two associates of Professor Brillinger since 1960's. The projects were coordinated by Nitis Mukhopadhyay, University of Connecticut-Storrs.

Carmen Capilla Romà, from Universidad Politecnica de Valencia visited the Department of Statistics and Operations Research, Universidade de Lisboa, from February to June 2005. She is developing collaborative research work with **Teresa Alpuim** on the subject of monitoring the air quality in the city of Valencia, using both temporal and spatial statistics methodology.

American Statistical Association, Section on Statistics and the Environment, 2005 Election Results: Chair-Elect, 01/06 – 12/06, **Mary Christman**, University of Florida, and Program

Chair-Elect, 01/06 – 12/06, **Peter Guttorp**, University of Washington.

2.3 Society News

16th Annual General Meeting of TIES

The 16th Annual General Meeting of TIES will be held during TIES 2005 in Beijing, China August 21-26. Please check the conference program for the time and attend if you will be in Beijing. This is a crucial time for members to give their input to the Board of Directors and this meeting is one such opportunity.

3. Environmetrics Conferences

3.1 Forthcoming TIES Conferences

TIES 2005, Friendship Hotel, Beijing, China August 21-26.
Ray Correll

Planning for the TIES2005 Conference is nearly complete and attendees will have an interesting scientific program as well as some excellent social events.

There will be a strong emphasis on water management at the conference, starting with the President's Invited Lecture given by Professor Tony Jakeman. Tony's lecture is entitled Integration Frameworks and Methods for Water Resource Management. We are also privileged to have Dr Xia Jun as an invited speaker – his topic is Hydrological Science Opportunities and Challenges in China: Discussion on Observation, Process and Uncertainty.

The Hunter Lecture will be delivered by Professor Michael Stein whose topic is Spatio-Temporal Models for Environmental Science and Management.

There will be several papers on greenhouse gases and the effectiveness of the Kyoto agreement. These are very topical and will provide much interest.

There is a range of other fascinating topics, including a session on rangelands management, environmental chemistry and oil spills.

The conference will be very memorable – we recommend that if you have not registered yet you do so immediately.

Further details are available at the conference web site: http://www.cmis.csiro.au/ties2005/

Ray Correll email: Ray.Correll@csiro.au

We are very grateful to the efforts of Candace Culyer and Ms. Cuiling LAN who are maintaining the websites.

TIES 2006, Kalmar, Sweden, June 18-22.

The venue is the medieval town of Kalmar in southern Sweden. The conference site is situated in the Harbour of Kalmar, with the plenary sessions in the conference building

Kalmarsalen and afternoon sessions at the University of Kalmar nearby.

Most of the plenary talks will focus on the following themes:

- Are extreme weather events becoming more common?
- Can we attribute environmental effects to actors and activities?
- Can we monitor the abundance of a multitude of species?

In addition, the conference will include a number of contributed sessions on spatio-temporal modelling, extremes, and other topics normally found at TIES meetings.

More information can be found on the conference web-site:

http://www.mai.liu.se/ties2006/

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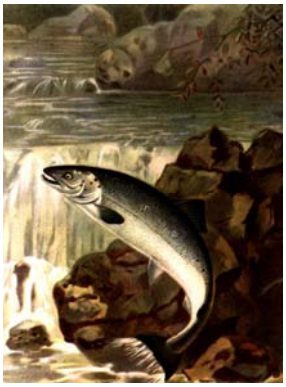
3.2. Other Forthcoming Conferences

TIES-Sponsored Conferences

Statistics for Aquatic Resources: Monitoring, Modeling, and Management

Oregon State University, Corvallis, Oregon. September 7-9, 2005



The aim of the conference will be to improve our understanding of the status and trends of aquatic plant and animal populations, fisheries, wetlands, water quality, and water abundance. The meetings will feature discussion of recent findings in statistical research into methods of monitoring, modeling, and managing aquatic resources, including lakes, streams, estuaries, near-coastal waters, wetlands, and the associated physical habitat and biological communities. Session topics will include design and analysis of aquatic resource surveys; design-based/model-assisted survey methodology (including small area estimation), analysis of rotating panel designs and incorporation of ancillary or non-probability information, and spatial and temporal modeling. Approaches to monitoring and assessment of aquatic resources and management implications will receive special emphasis. We encourage the participation of statisticians and environmental scientists with an interest in any aspect of monitoring, modeling, or managing aquatic resources. Invited speakers include Noel Cressie, Steve Thompson, Jay Ver Hoef. A one-day workshop on Designing Aquatic Resource Surveys will be given in conjunction with the conference.

Representatives from the Oregon Plan Monitoring Team will join us in a plenary session to discuss the lessons learned from a recent assessment of the Oregon Plan's efforts to conserve and rebuild coastal coho salmon populations. The Oregon Plan for Salmon and Watersheds is Oregon's cooperative effort to restore salmon runs, improve water quality, and achieve healthy watersheds and strong communities throughout the state.

Conference is co-sponsored by the USEPA-funded programs DAMARS (Program on Designs and Models for Aquatic Resource Surveys) at Oregon State University and STARMAP (Space-Time Aquatic Resource Modeling and Analysis Program) at Colorado State University, the Section on Statistics and the Environment of the American Statistical Association (ENVR), and The International Environmetrics Society (TIES).

Deadline for submission of abstracts for consideration for oral or poster presentation is July 1, 2005. Authors of accepted papers will be notified by July 15, 2005. Abstracts may be sent by email to stevens@science.oregonstate.edu or mailed to Statistics for Aquatic Resources Conference, Statistics Department, 44 Kidder Hall, Oregon State University, Corvallis, OR 97331.

For more information contact **Don Stevens**, (541) 737-3587 or visit our website http://oregonstate.edu/dept/statistics/epa_program/meeting.html.

3.3. Reports on Related Events

55th Session of the International Statistical Institute, 5-12 April 2005, Sydney, Australia. Environmental Statistics Theme Day and Related Sessions

Bronwyn Harch and Sylvia Esterby

The Environmental Statistics Theme Days April 6 and 7, coordinated by Larry Cox, had three Invited Papers Sessions, a Tutorial Session, and related Invited and Contributed Papers.

- *Statistics, Environmental Health & Risk Assessment*, organized by Peter Guttorp and chaired by Paul Switzer.

David Brillinger spoke about his experiences in the area of environmental risk as related to floods, wildfires, earthquakes and space debris, and stressed the importance of having a quantitative measure of consequences, a damageability matrix. Louise Ryan focused on environmental contaminant risk in humans, using the example of arsenic, and on quantifying uncertainty in risk assessment, giving her thoughts on challenges in the area. David Marker spoke on measuring pesticides, lead, allergens and other hazards in homes, and discussed issues involved in large, multidisciplinary studies. Discussant David Fox elaborated on several aspects of quantitative risk assessment and noted that the speakers did not provide their definition of risk. This led to a lively discussion about risk metrics.

- *Safeguarding the Food Chain*, organized and chaired by Abdel El-Shaarawi.

Mary Barnes gave a talk about a dietary study in Bangladesh to assess the amount and sources of arsenic intake among villagers, outlining the challenges in articulating the risks and consequences for survey design. Eric Smith described results on the use of model-based clustering in a Bayesian framework to determine eco-regions in river catchments where data are available on multiple biological and environmental variables. Issues in design and analysis, related to monitoring programs for agricultural pests at low density, were discussed by Sylvia Esterby, based on the example of a sterile insect release program in apple orchards. Abdel El-Shaarawi reviewed recent changes in aquatic life in the Great Lakes ecosystem, which included modelling of accumulation of contaminants in fish tissue and the relationship to regulations, and the impact of exotic species such as zebra mussels.

- *Beyond Kyoto - The Science, Policy and Impacts of Climate Change*, organized and chaired by Richard Smith.

The topics of policy and impacts were discussed by the first and third speakers in the session. Bob Beeton brought his extensive experience in environmental problem solving and policy issues associated with environmental management to his talk on climate change: facts, opinions and dilemmas. Myles Allen addressed the topic of attribution of human influence on climate; how to link responsibility and who is paying or will pay for the impact of climate change. Some approaches and their implications were discussed. Claudia Tebaldi reported on a project to provide probability projections of temperature change at regional scales, addressing the question of reconciling projections from different global climate models.

- Environmental Theme Day Tutorial Session, *An Overview of Environmental Statistics*, given by Richard Smith.

The session was very well attended and received. This bodes well for the interest of young statisticians

in Environmental Statistics. Richard covered the three areas i) spatio-temporal modelling, ii) monitoring design in networks (eg rivers) and iii) extreme values. The tutorial can be found at www.stat.unc.edu/postscript/rs/isitutorial.pdf .

▪ Some Related Sessions were as follows (related papers were also given on other days):

1) *Ranked Set Sampling – 50 Years*, organized by Herbert A. Hand, included a paper on Cost Analysis for incorporating human judgment in ecological and environmental sampling by Loveday Conquest.

2) *Sampling Methods for Animal Populations*, organized by Alan Welsh, included a paper by Louis-Paul Rivest on recent developments in Mark Recapture experiments using log-linear models.

3) *Natural Resource Statistics* Session, which included talks on spatial-temporal rainfall processes by Valerie Isham, multistate rainfall generation models by Peter Thomson, transfer modelling of sediment-nutrient load by David Fox, spatially-balanced sampling of a stream network by Don Stevens, and estimating the size of southern blue fish tuna by Geoff Laslett.

The complete program is available at http://www.tourhosts.com.au/isi2005/media/ISI_Bulletin3.pdf

The **GRASPA Conference 2005**, *"Statistics for Environmental Decisions"*, was held in Bertinoro, Italy, on 21-23 April 2005. Information, program and presentations are available on the web (www.graspa.org/Bertinoro2005).

Alessandro Fassò

The meeting, hosted in the beautiful medieval citadel, was an interesting example of ongoing TIES regional activity. As a matter of fact, the results of the 2003-2004 Italian research project *"Statistics as an aid for environmental decisions: identification, monitoring and evaluation"* was discussed in a mainly European frame with invited speakers Anders Grimvall, Peter Guttorp, S. Hajat, Marion Scott and Jorge Mateu and attendees.

Scientific sessions included:

- *Health and Environment:* statistical aspects of the socalled MISA 2 research project on health effects of air pollution in North Italy, see [1].

- *Space-time models:* theoretical aspects of nonstationary and nonseparable covariances and application to air quality and fine particulate.

- *Spatial sampling*: Horvitz-Thompson estimation in complex spatial sampling.

- *Environmental indices, standards and environmental decisions*.

In the closing Panel Discussion on *"European Environmental Networks"* it has been suggested to exploit the opportunities of the statistical societies and the European networks for official statistics regarding the environment (ISI, TIES and EUROSTAT). This will be easier if TIES becomes an ISI section. Moreover, coordination enhancement is recommended to promote common activities such workshops, conferences and a European School on Environmental Statistics.

Both scientific discussion and conviviality were facilitated by the cuisine from the region which merges the Mediterranean and the north Italian cooking and good wine.

Information, program and presentations are available on the web (www.graspa.org/Bertinoro2005).

Reference

[1] Biggeri A., Bellini P., Terracini B. (2004) Meta-analysis of the Italian Studies on Short-term Effects of Air Pollution 1996-2002, *Epidemiologia e Prevenzione*, 28, Supplement (4-5), 1-100.

Editors's note: Late publication of the Newsletter has moved the following item from an announcement to a report and the Editors have made some suitable modifications. We hope for an update in the next issue of the Newsletter.

STATISTICS AND ENVIRONMENTAL MONITORING

Joint meeting of the Royal Statistical Society Environmental Statistics Section and the European Region of The International Environmetrics Society. Thursday 2 June 2005.The Royal Statistical Society, London UK

Marian Scott

Oral papers scheduled are summarized below. A poster session and the Annul General Meeting of RSS Environmental Statistics Section were also part of the days proceedings.

Design and analysis of environmental monitoring programs - an example from the Kattegat. Helle Rootzén (Technical University of Denmark)

Reporting on the state of the marine environment can be improved using statistical methods for design of monitoring programs and linked data analysis, illustrated using measured dissolved inorganic nitrogen for 1993-97 in the Kattegat. Proposed approaches are relatively simple but can handle missing data and utilize spatial and temporal correlation.

How best can geoscientists use detailed environmental data? Susan Waldron (University of Glasgow)

Geoscientists can now collect large volumes of data to describe systems in detail, and the incredible value of continuous detailed data sets, as with remediation of acidified water bodies, is recognised. Extracting temporal and spatial trends and assessing use of system descriptions in a predictive manner are important statistical issues.

What can we learn from routine environmental monitoring data? Marian Scott (University of Glasgow)

Many millions of pounds are spent on routine collection of environmental data, subsequently used for many purposes including assessment of long-term change, ascertaining impacts of accidental pollution, and assessing compliance with objectives. I review some statistical methods used to analyse routine monitoring data with illustrations from air and water quality.

Combining deterministic and stochastic models for modeling, estimation and prediction of spatial-temporal environmental processes. Montserrat Fuentes (North Carolina State University)

Estimating spatial temporal trends of air pollution levels is vital for air quality management. Generally there are pollution measurements at only a sparse set of monitoring stations and there are outputs of regional scale air quality models. A hierarchical statistical model combines different sources of information for improved trend estimation.

Uncertainty analysis of boreal forest phytomass and Net Primary Productivity (NPP) in Central Siberia. Amanda Thomson, Centre for Ecology and Hydrology Edinburgh

This talk describes an uncertainty analysis of a greenhouse gas inventory of the Siberian terrestrial ecosystem, focussing on forest phytomass and forest NPP. The sizes of these components are highly uncertain, due to natural variability and systematic uncertainty. Methods and results from Monte Carlo modelling in S-Plus will be presented.

Objective analysis, sequential data assimilation and geostatistics: some interactions. Hans Wackernagel (Ecole des Mines de Paris).

Meteorologists and oceanographers use 'objective analysis', actually simple kriging for a spatial interpolation of differences between observations and forecasts from a numerical model. This is also the analysis step of extended and ensemble Kalman filters for sequential data assimilation. The potential for implementing geostatistical concepts in data assimilation is discussed.

Further details are available at www.jiscmail.ac.uk/envstat , through the RSS website www.rss.org.uk or through the TIES website (www.nrcse.washington.edu/ties/).

4. Young Environmetricians

This Section will return in the November issue with submissions solicited by the Editors. However, we would still like to have submissions and suggestions for the Section sent to us by graduate students, or even not so young Environmetricians.

5. Environmetrics Forum

We thank David Fox for this opinion piece and hope that its publication will provoke further discussion on the topic. Please note that David kindly agreed to publication, although the piece was written earlier. It was an Editorial decision to retain all the references to web pages to maintain the integrity of the article, but we acknowledge that some of the links may be obsolete.

OPINION: Environmental Statistics – It doesn't add up!

Given the enormity and pervasiveness of environmental issues confronting the world, one would have thought that mathematicians and statisticians would be overwhelmed with work associated with environmental measurement, modelling and monitoring. However, it has been reported that Australia's best and brightest mathematical brains are deserting us at an unprecedented rate (*The Age, August 14, 2002).*

Statistics has its genesis back in Roman times when information on the 'State' (typically taxes) was gathered in a systematic way. While such routine data gathering exercises still exist, the discipline of statistics embraces and is built upon advanced mathematical, computing, and probabilistic methods. The application of these tools to help better measure, monitor, and manage our environment is unfortunately patchy. *State of Environment (SoE)* reporting at federal and state levels is now commonplace and while this is a positive and necessary step in assessing environmental condition, the '*State of Statistics' (SoS)* is languishing. Declining student numbers in mathematics courses, lack of research funds, and a general malaise for all things quantitative are cited as evidence of our national indifference to the mathematical sciences. In October 2000, the Federation of Australian Scientific and Technological Societies (FASTS) released Occasional Paper number 3 titled "Mathematical Sciences in Australia: Looking for a Future" (http://www.the-funneled-web.com/PDF_Documents/FASTS-Maths%20assessment.pdf) and a follow-up paper "Mathematical Sciences in Australia: Still Looking for a Future" (http://www.austms.org.au/AustMath/braindrain_2002.pdf) in 2002. These were impassioned pleas for increased national awareness of the relevance and importance of mathematics education through increased funding for research and teaching in the mathematical sciences. Three years down the track and not much has changed. Indeed, in its "Maths is Boring" edition of Ockham's Razor (ABC Radio, April 15, 2001) the issue of whether or not students should be required to study mathematics if they didn't think they needed to was entertained.

So why is maths perceived as boring and irrelevant to many? Why is there a major disconnect between "wickedly complex" environmental problems and the level of statistical R&D devoted to their solution? While the Universities and CSIRO continue to wrestle with the identification of their respective niches (*'CSIRO – Up for Grabs',* The Science Show, ABC radio October 5, 2002) we have the federal Environment and Heritage Minister, Dr. David Kemp emphasising the need for "sound science" - particularly as it relates to things like salinity hazard mapping (keynote address AgForce State Conference, Biloela, July 29 2002). Furthermore, Dr. Kemp went on to say "Certainty in relation to the science –at least as much certainty as science is able to deliver - is an entirely reasonable demand". The issue of certainty (or more precisely, *uncertainty*) is the stuff of statistics. One would have thought that the statisticians would be having a field day in an environment characterised by high levels of uncertainty, low levels of data, and a backdrop of huge spatial-temporal variability. Alas, this is not the case. As one of my EPA colleagues recently remarked "consulting with a statistician is like a visit to the dentist to have teeth extracted". And therein lays a big part of the problem. Regrettably, our profession seems to have earned itself a reputation for its petulant and punitive admonishment of 'non-statisticians' who have dared collect and analyse data using statistical tools.

It's ironic that the statistics profession continues to lament its perceived undervalued, unloved status among other researchers and the broader community when it continues to slap the wrists of those seeking

advice and assistance. Responses of "you should have come to see me sooner" or "I can't do anything for you unless you obtain more samples" are recounted with alarming frequency. If it's any comfort, Australian Statisticians are not alone. An article in *The American Statistician* noted (yet again) that courses in statistics "for the most part, focus on the same methods that were taught 30 years ago". The same article cites a past President of the American Statistical Association as saying "We smell trouble all around us. Other disciplines and organisations have been seizing opportunities that should have been ours". The paranoia and preciousness among statisticians is high. Perpetual questioning of relevance with little action, uptake or results will not advance the statistician's lot and runs the risk that genuine concern will be seen as bleating.

So what can be done? Quite a lot actually. As far as the environment is concerned, there's a plethora of research challenges for Statisticians. A consequence of outdated courses and the migration of statistics education away from mathematics and statistics departments is the 'straightjacket' approach to statistical application and problem-solving in the environmental sciences. Thus, on the one hand it is pleasing to see a greater awareness of the principles of statistical design among environmental scientists, it is nevertheless disturbing that critical statistical analysis underpinning major Natural Resource Management (NRM) decisions and investments is being compromised by a lack of access to robust and contemporary statistical methodology. To overcome this, there needs to be improved coordination, communication, and collaboration between statisticians and environmental scientists. For their part, the statisticians need to adopt a more 'hands-on' approach. The environment is big place and Mother Nature does not yield to the sort of designed experimentation characteristic of controlled industrial or laboratory processes. So while it is possible to sit in an office and run computer software to help design a water quality monitoring strategy, the broader appreciation that accrues from actually getting out there and witnessing the data collection is invariably lost. As a practising Statistician who has flown down river gorges in Papua New Guinea, snorkelled in seagrass meadows, and waded in the murky waters around a sewage outfall, I can attest to the value of this type of 'fieldwork'.

Commensurate with an increase in collaboration between Statisticians and researchers in the environmental, biological, and life sciences, is a need to provide statistical training that is more in step with the statistical rigour that sound environmental monitoring, sampling, and assessment demands. The 'classical' statistical methods taught in most university departments today are often-times ill suited to environmental applications. This is by virtue of data paucity, non-standard distributions of environmental variables, dependencies in space and time, and high background variation. *Environmetrics* is now a well-established discipline and is devoted to tackling precisely these sorts of issues. Currently, no Australian university offers a degree in 'Environmetrics' although the University of Melbourne is presently designing a Masters course as part of its Graduate Environmental Program. Graduates in Environmetrics will contribute to important areas of environmental research and development including:

Development of risk-based tools for natural resource management;

- Setting statistically (and legally)defensible targets for water quality, sediment loads, nutrient concentrations etc. in the bays, estuaries and water bodies of Australia;
- Quantification of risks associated with genetically modified organisms, invasive pests, and biological threats;
- Identification of 'optimal' monitoring designs to help government agencies establish the effectiveness of large-scale remediation programs under National Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAPSWQ);
- Obtain estimates of error and uncertainty in the outputs of biophysical models such as those used to describe the areal extent of the salinity problem;
- Integration of statistical information systems (SISs) with ubiquitous GISs to provide improved representation of spatial processes;

I believe the future for environmental statistics is bright. Increasingly, we are seeing increased funding for measurement, monitoring, and evaluation of natural assets. The research challenges are great and one only needs visit the CISES website

(http://galton.uchicago.edu/~cises/) or that of its predecessor, NRCSE (http://www.nrcse.washington.edu/research/projects.html) to gain an appreciation for the scope and complexity of issues confronting our profession. The challenge is to make ourselves and our work accessible, relevant, and enduring.

David Fox is on secondment from CSIRO Land and Water and is currently Professorial Fellow in the Department of Civil and Environmental Engineering at the University of Melbourne. He is also Director of the newly established *Australian Centre for Environmetrics* (http://www.civenv.unimelb.edu.au/research/centres/ace.html) .

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6. Research Projects and Programmes

In this section of TIES Newsletter members are invited to describe the Environmetrics research projects they are involved with. It is our aim, not only to show the many different ways quantitative methods are being applied to Environmental Sciences, but also to give knowledge about who is working on what problems. Academic programmes related to environmental problems are welcome. We believe that this will contribute to increased scientific interchange among TIES members.

EPA's 2005 Stratospheric Ozone Protection Award

Linda Barrows CISES, University of Chicago

The "Tiger Team", a group funded by the STAR Center for Integrating Statistics and Environmental Science (CISES) at The University of Chicago, has won EPA's 2005 Stratospheric Ozone Protection Award. EPA Administrator, Stephen Johnson, and Assistant Administrator for the Office of Air and Radiation, Jeffrey Holmstead, were invited to speak at the awards ceremony. Also attending from EPA were Drusilla Hufford, Director of the Stratospheric Protection Division; Kathleen Hogan, Director of the Climate Protection Partnerships Division; and other senior officials. The award for the team's project, called "The Detection of a Recovery in Stratospheric and Total Ozone," was presented at a ceremony on Wednesday, May 4, 2005, in Washington, D.C

The Tiger Team, composed of top-notch statisticians and atmospheric scientists from universities and government laboratories in the U.S. and Canada, have played a large role in the understanding of human impacts on global tropospheric and stratospheric ozone, with many significant firsts that have had a major influence eon the policy developments to protect stratospheric ozone. The Tiger Team grew out of discussions between federally funded atmospheric scientists and industrially supported statisticians, who in the late 1970s and early 1980s were both trying to determine whether the hypothesis for chlorofluorocarbon effects on ozone was valid. After determining that coordination between the different discipline approaches could provide a powerful new approach to studying ozone trends, the Tiger Team officially came together in 1982, with its first major journal publication in 1984. The Tiger Team is still making major contributions to understanding ozone trends and corresponding policy implications. Although the membership in the Tiger Team has changed somewhat over the years, the current Team has largely been together for many years and reflects the multidisciplinary nature of the team over the years. Many of the current members are funded through the *Center for Integrating Statistical and Environmental Science* at The University of Chicago, an EPA-funded Center. The team includes statisticians like George Tiao of the University of Chicago and Serge Guillas of Georgia Tech, and atmospheric scientists like Alvin J. Miller of the NOAA Climate Prediction Center, Donald Wuebbles of the University of Illinois, Betsy Weatherhead of the University of Colorado CIRES, and Vitali Fioletov of Environment Canada. One of the original members, Greg Reinsel of the University of Wisconsin, died suddenly in May of 2004.

Through their combination of statistical and scientific analysis, the Tiger Team was the first to actually statistically prove that a decrease in stratospheric ozone was occurring in the early 1980s. Their analyses, both in journal publications and in national and international assessments of the concerns about ozone, demonstrated this decrease was happening in the total ozone column and in the altitude distribution of ozone. The Tiger Team proof of ozone decrease in the upper stratosphere, in concert with the discovery

and attribution of the Antarctic ozone hole, was a principal component leading up to the ratification of the Montreal Protocol. Their trend analysis of an ozone decrease in the lower stratosphere based on ozonesonde data indicated why the total ozone trend was so much greater than allowed for by the upper level loss.

The Tiger Team analysis approach, combining statistical time series analysis with scientific understanding of ozone processes, has become the standard used around the world in analyzing ozone observations for trends. They have refined and extended this approach over the last two decades, applying it to both ground-based and satellite datasets, leading to ever-enhanced understanding of the role being played by human activities in effecting ozone. In recent research, the Tiger Team has established the basis for detectability of an observed turnaround in ozone in response to the effects of the Montreal Protocol. The latest studies are the first to effectively combine atmospheric observations with results of theoretical modeling of atmospheric processes in statistically analyzing ozone trends and the detectability of ozone recovery.

The Tiger Team has also used their expertise to analyze temperature records, and were the first, in 1992, to show that observed decreases in lower stratospheric temperatures could best be explained by a combination of the observed ozone trends and increasing atmospheric carbon dioxide concentrations. These findings form over a decade ago have been substantiated by recent measurements.

Tiger Team Members:

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Yue Li, University of Illinois (graduate student) Airong Cai, University of Illinois Chicago (graduate student)

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7. Forthcoming Papers in *Environmetrics*

Abdel El-Shaarawi, Editor-in-Chief

Sofia Aberg, Finn Lindgren, Anders Malmberg, Jan Holst and Ulla Holst: An image warping approach to spatio-temporal modeling.

Brent Henderson: Exploring between site differences in water quality trends: A functional data analysis approach.

Matthew W. Mitchella, Marc G. Gentonb, Marcia L. Gumpertz: Testing for separability of space-time covariances.

R. N. Ellis, P. M. Kroonenberg, B. D. Harch and K. E. Basford: Nonlinear principal components analysis: An alternative method for finding patterns in environmental data.

Richard M. Engeman, Ryan M. Nielson and Robert T. Sugihara: Evaluation of optimized variable area transect sampling using totally enumerated field data sets.

Lucio Barabesi and Marzia Marcheselli: Monte Carlo integration strategies for design-based regression estimators of the spatial mean.

Henriette I. Jager, Rebecca A. Efroymson, Kerry L. Sublette, and Tom L. Ashwood: Unnatural landscapes in ecology: generating the spatial distribution of brine spills.

Noriah M. Al-Kandari and Ian T. Jolliffe: Variable selection and interpretation in correlation principal components.

Richard E. Chandler: On the use of generalized linear models for interpreting climate variability.

J. Gani_ and L. Stals: A continuous time Markov Chain model for a plantation-nursery system

Meng Ling, Hanadi S. Rifai, and Charles J. Newell: Optimizing groundwater long-term monitoring networks using Delaunay triangulation spatial analysis techniques.

Yiliang Zhu: Dose-time-response modeling of longitudinal measurements for neurotoxicity risk assessment.

Grace Chiu and Peter Guttorp: Stream health index for the Puget Sound lowland

8. TIES Board of Directors

The following are the names of the elected members of TIES Board of Directors. All terms are from September 1, 2004, to August 31, 2006, except the 4-year terms of the regional directors.

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Anders Grimvall
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Regional Representatives (date term ends**):**

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Jeanette O'Hara Hines (31/08/06)
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Europe:

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(P.Challenor@soc.soton.ac.uk)

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Other Regions:

Lelys Bravo de Guenni (31/08/08)
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Jacky Galpin (31/08/06)
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TIES Newsletter is a publication of the International Environmetrics Society (TIES). It is published semiannually, or whenever the need arises, by The International Environmetrics Society and distributed to TIES members as part of their annual dues. Contact Anders Grimvall,

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for questions regarding membership and other benefits.

Objectives of the Newsletter include (but are not limited to):

- To keep TIES members informed of what is happening within the Society;
- To cover news in latest developments in theory and applications of environmetrics;
- To be a forum for discussion of a broad range of issues which are of interest to members of TIES and are consistent with the objectives of the Society.
- To facilitate communication between environmental scientists and statisticians about research problems of mutual interest.
- To provide details about upcoming conferences and workshops related to Environmetrics;
- To announce members' news that are worthy of notice or recognition (e.g., awards, prizes and honors received, promotions, appointments, etc.)

Communications, (e.g., contributions, comments and suggestions) regarding this publication should be addressed to the TIES Newsletter editors: Sylvia Esterby (sesterby@exchange.ubc.ca), Alessandro Fasso (alessandro.fasso@unibg.it).

The Editors would like to encourage TIES members to submit items for publication in the Newsletter. We

would like to have a very comprehensive publication that is of interest to our members by including items such as members' and regional news, Environmetrics and related conferences, research projects and programmes, book reviews, letters to the editor and articles of general interest.

We would like to thank the members who responded to our call and contributed to this issue. It is our hope that the Newsletter will be a valuable platform for discussion and exchange of ideas among us. We will be happy to hear your views about the contents and style of this issue. We hope that you will be a reader as well as a contributor.

TIES Webpage:
http://www.nrcse.washington.edu/ties