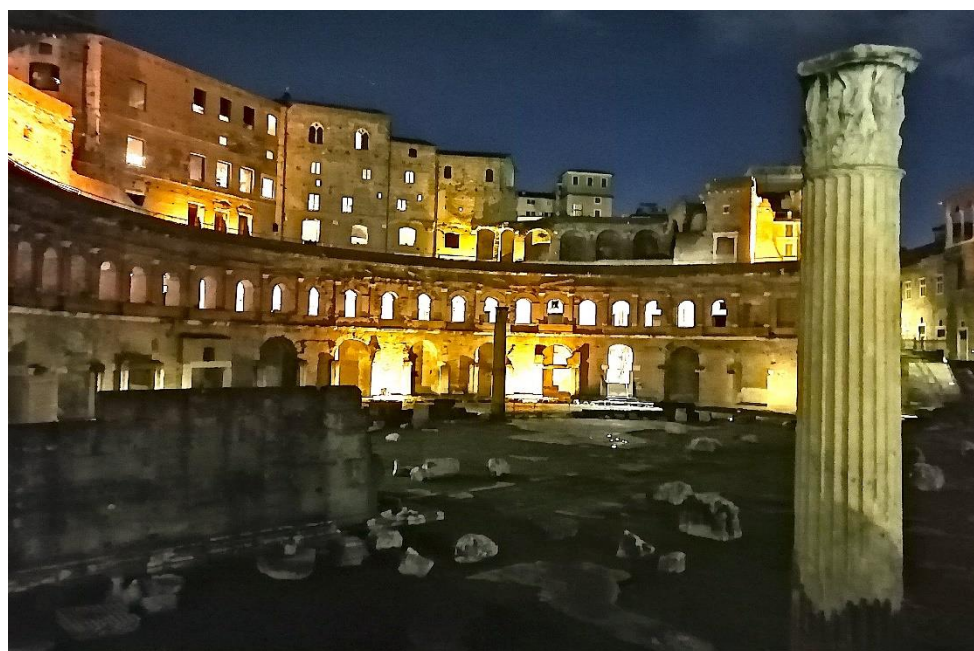




Proceedings of the GRASPA 2021 Conference Rome, 07-09 June 2021



Edited by: Giovanna Jona Lasinio and Francesco Lagona



2021

Proceedings of the GRASPA 2021 Conference

Rome, 07-09 June 2021

Edited by: Giovanna Jona Lasinio and Francesco Lagona.

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GRASPA 2021

June 7-9 2021

Sapienza University of Rome - Department of Statistics

time schedule

Monday, June 7th

14:30 – 15:00	Conference Opening and Welcome Address
15:00 – 16:00	Invited Session I (3 invited speakers)
16:00 – 16:15	Break with Break-out-rooms
16:15 – 17:15	Keynote speaker I
17:15 – 17:30	Break with Break-out-rooms
17:30 – 18:50	Session II (4 invited speakers)

Tuesday, June 8th

15:00 – 16:00	Invited Session III (3 invited speakers)
16:00 – 16:15	Break with Break-out-rooms
16:15 – 17:15	Keynote speaker II
17:15 – 17:30	Break with Break-out-rooms
17:30 – 18:50	Session IV (4 invited speakers)

Wednesday, June 9th

15:00 – 16:00	Invited Session V (3 invited speakers)
16:00 – 16:15	Break with Break-out-rooms
16:15 – 17:15	Keynote speaker III
17:15 – 17:30	Break with Break-out-rooms
17:30 – 18:50	Session VI (4 invited speakers)
18:50 – 19:10	Best Poster Awards and Closing Ceremony

Monday, June 7th

Session 1: Environmental spatiotemporal statistics (chair: Alessandro Fassò)

15:00-15:20	Song Xi Chen	Effects of COVID-19 Control Measures on Air Quality in North China
15:20-15:40	Mara Bernardi	InSAR data post-processing via functional data analysis with application to the case of Santa Barbara mud volcano
15:40-16:00	Paolo Maranzano	Model selection and inference in spatio-temporal models using a penalised likelihood approach

Keynote Session 1 (chair: Giovanna Jona Lasinio)

16:15-17:15	Sudipto Banerjee	Spatial "Data Science" Meets Bayesian Inference
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Session 2: Complex data with spatial dependence (chair: Rosalba Ignaccolo)

17:30-17:50	Stefano Castruccio	Forecasting Air Pollution from Urban Citizen Science Networks with Probabilistically Calibrated Echo State Networks
17:50-18:10	Dyonisios Hristopulos	Boltzmann-Gibbs models for spatio-temporal data
18:10-18:30	Sara Fontanella	Persistent homology in network analysis and its application to environmental data
18:30-18:50	Alessandra Menafoglio	A spatial and distributional analysis of natural background level concentrations in large-scale groundwater bodies

Tuesday, June 8th

Session 3: Marine Ecology (chair: Alessio Pollice)

15:00-15:20	Crescenza Calculli	Bayesian estimation of multiple ecological abundances
15:20-15:40	David Conesa	Incorporating biotic information in Species Distribution Models: a coregionalised approach
15:40-16:00	Sara Martino	The combined use of spatial data derived from conventional research protocols and social media platforms: making this integration possible to predict dolphin distribution

Keynote Session 2 (chair: Francesco Lagona)

16:15-17:15	Ashley Steel	Global Woodfuel Production: A Simple Model?
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Session 4: (chair: Massimo Ventrucchi)

17:30-17:50	Linda Altieri	Estimation of the biodiversity of a system with covariates and dependence
17:50-18:10	Elias Krainski	Spacetime modeling of ocean carbon in the North Atlantic region
18:10-18:30	Tullia Padellini	Bayesian spatio-temporal model for integrating multiple sources of COVID-19 prevalence
18:30-18:50	Simone Vantini	Nonparametric local inference for functional data with manifold domain and temporal dependence

Wednesday, June 9th

Session 5: Small area estimation (chair: Francesco Finazzi)

15:00-15:20	Serena Arima	Modelling under reporting in small area data
15:20-15:40	Aldo Gardini	Bayesian small area models with log-transformed response
15:40-16:00	Domingo Morales	Poisson mixed models for predicting number of fires

Keynote Session 3 (chair: Luigi Ippoliti)

16:15-17:15	Michela Cameletti	A year of Covid-19 pandemic in Italy: impact on air pollution and mortality
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Session 6: Advances in environmental epidemiology (chair: Laura Sangalli)

17:30-17:50	Michela Baccini	Dynamics of SARS-CoV-2 infection in the Italian regions: a descriptive study based on compartmental models
17:50-18:10	Pasquale Valentini	A time varying parameter regression model to investigate the relationship between intensive care occupancies and confirmed COVID-19 deaths in European NUTS-2 Regions
18:10-18:30	Emanuele Giorgi	A geostatistical framework for combining spatially referenced disease prevalence data from multiple diagnostics
18:30-18:50	Maria Franco Villoria	Revisiting space-time disease mapping models

Preface

GRASPA 2021 is the biennial conference of the Italian research group for Environmental Statistics GRASPA-SIS and the major event on Environmental Statistics in Italy. GRASPA 2021 is also the 2021 European regional conference of The International Environmetrics Society and a Satellite Meeting of the 2021 World Statistics Congress. GRASPA 2021 endorses cooperation among statisticians, academics from environmental sciences, and practitioners from government and independent environmental agencies, creating a space for exchanging experiences and ideas on various aspects relevant to protecting the natural environment. GRASPA 2021 is an opportunity to share research interests related to the development and the use of statistical methods in environmental sciences, fostering methodological developments and applications in various environmental fields. This year the online choice for the conference may seem to limit personal exchanges and discussions. We prefer to view it as the occasion to learn how to use new ways to communicate effectively. We imagined a workshop with fewer talks, but all in plenary sessions, posters transformed to short videos and zoom rooms to allow exchanges in small groups. We hope to meet in person very soon and, in the meantime, keep the scientific exchange alive with whatever tool we can use.

Rome,
June 2021

*Giovanna Jona Lasinio
Francesco Lagona*

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Bayesian estimation of multiple ecological abundances

C. Calculli and S. Martino and P. Maiorano

Abstract Ecological processes driving the spatial and spatio-temporal distribution of marine species are complex to assess. In fact in several ecological studies, counts, abundances or biomass of interacting species are collected from different sites resulting in sparse datasets that include highly correlated responses. The analysis of relationships among such responses requires a suitable statistical framework to globally study the ecosystem, including relevant variables and combining in a single step environmental and community information. Inspired by Joint species distribution models, we propose a Bayesian model-based approach to deal with the zero-inflation issue, common to semi-continuous data, and with the spatial (and spatio-temporal) structure of abundance monitoring data. The proposal takes its cue from a case study concerning marine litter data collected by fishery surveys in the central Mediterranean. To jointly infer different litter categories, a multiple response Hurdle-model is proposed. This model allows to combine both information on occurrence and conditional-to-presence abundance of litter categories and the effects of environmental potential drivers. Shared spatial effects that link abundances and probabilities of occurrences, together with temporal effects, are efficiently implemented using the SPDE-INLA approach. Results support the possibility of better understanding the spatio-temporal dynamics of marine litter in the study area.

Keywords: spatio-temporal data, species distribution models, hurdle models, marine litter, INLA

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