Abstracts (Smögen 2014)

Magne Aldrin (Magne.Aldrin at nr.no)

Title: Bayesian estimation of climate sensitivity based on a simple climate model fitted to observations of hemispheric temperatures and global ocean heat content

Abstract: Predictions of climate change are uncertain mainly due to uncertainties in the emissions of greenhouse gases and how sensitive the climate is to changes in the abundance of the atmospheric constituents. The equilibrium climate sensitivity is defined as the temperature increase due to a doubling of the carbon dioxide concentration in the atmosphere when the climate reaches a new steady state. Carbon dioxide is only one out of several external factors that affect the global temperature, called radiative forcing mechanisms as a collective term. In this work, I present a model framework for estimating the climate sensitivity. The core of the model is a simple, deterministic climate model based on elementary physical laws such as energy balance. It models yearly hemispheric surface temperature and global ocean heat content as a function of historical radiative forcing. This deterministic model is combined with an empirical, stochastic model, and fitted to observations on global temperature and ocean heat content, conditioned on estimates of historical radiative forcing. We use a Bayesian framework, with informative priors on a subset of the parameters and flat priors on the climate sensitivity and the remaining parameters. The model is estimated by Markov Chain Monte Carlo techniques.

Claes Andersson (andclae at chalmers.se)

Title: A hierarchical model for the spatial structure of epidermal nerve fibres

Abstract: Previous studies have indicated that the spatial structure of the nerve fibres in the epidermis is different in healthy subjects and subjects suffering from diabetic neuropathy. To better understand and characterise the differences a model is proposed and fitted to subjects with different disease status. For this purpose a large set of samples from different subjects with degrees of the neuropathy is available.

The nerve fibre data can be represented as multi type point patterns with a parent-daughter structure where the parent of each daughter point is known. To account for this a hierarchical model with asymmetrical interaction is suggested, where points of the same class interact and where each parent point influence its own daughter point. In the initial step the parent points from the data are used to find a suitable model for the interaction between parent and daughter points and between daughter points.

In the preliminary study it is found that the daughter points exhibit more regularity than the parent points. Thus a model with attraction between the parent and daughter points is used, while a Gibbs model is used for the interaction between the daughter points.

Anastassia Baxevani (baxevani.anastasia at ucy.ac.cy)

Title: Sample path asymmetries in random processes driven by second-order Levy motion (join with Podgorski, K. and Wegener, J.)

Abstract: We tackle an important although rarely addressed question of accounting for a variety of asymmetries frequently observed in stochastic temporal/spatial records. First, we review some measures intending to capture such asymmetries, that have been introduced on various occasions in the past, and then propose a family of measures that is motivated by Rice's formula for crossing level distributions of the slope. We utilize those asymmetry measures to demonstrate how a class of second order models built on the skewed Laplace distributions can account for sample path asymmetries. It is shown that these models are capable of mimicking not only distributional skewness but also more complex geometrical asymmetries in the sample path such as tilting, front-back slope asymmetry and time irreversibility. Simple moment based estimation techniques are briefly discussed to allow direct application to modeling and fitting actual records.

David Bolin (davidbolin at gmail.com)

Title: Quantifying the uncertainty of contour maps

Abstract: Contour maps are widely used in environmental statistics and applied spatial statistics to display estimates of surfaces. Instead of showing the estimated surface, only a fixed number of contour lines are shown in the contour map, and the number of lines should somehow reflect the uncertainty in the estimate. However, the statistical properties of contour maps are difficult to assess and quantifying the properties of such maps is a relatively unexplored area of research. The goal of this work is therefore to derive measures of the statistical uncertainty of contour maps. These measures are used to derive methods for deciding how many contour lines one should show and at which levels the lines should be drawn. The methods are demonstrated on simulated data and an application to temperature estimation is presented.

Olav Nikolai Breivik (olavnb at math.uio.no)

Title: Bycatch of juvenile cod in the Barents Sea shrimp fishery

Abstract: In this work we look at a spatio-temporal model for shrimp catch and bycatch of juvenile cod in the Barents Sea shrimp fishery. We assume that the underlying structures of where the shrimp and fish are located can be approximated with some covariates and a sum of independent Gaussian fields. In this sum of covariance structures we use theory described in (Lindgren et al., 2011) and (Cameletti et al., 2013). The Bayesian model is implemented in in the R-package INLA (Rue et al., 2009).

Ottmar Cronie (ottmar at alumni.chalmers.se)

Title: A J-function for spatio-temporal inhomogeneous point processes

Abstract: In this talk we propose a new summary statistic for inhomogeneous spatio-temporal point processes, under the assumption of so-called intensity-reweighted moment stationarity. The statistic, which is defined through the so-called n-point correlation functions of the point process, reduces to the usual notion of a J-function when stationarity is assumed. We show that our statistic can be represented in terms of the generating functional and that the well-known spatio-temporal inhomogeneous K-function may be obtained as second order approximation of our statistic. We further discuss its explicit form under some specific model assumptions and give a ratio-unbiased estimator for it. We finally illustrate the use of the statistic on some simulated data.

Arnoldo Frigessi (arnoldo.frigessi at medisin.uio.no)

Title: Bayesian Inference for Ranks

A**bstract:** Analysis of rank data has received renewed interest recently, due to novel applications in the era of big data. In this lecture we will present a Bayesian approach to rank estimation, based on Mallows models with any right-invariant metric, thereby allowing for greatly extended flexibility compared to present methods. Data can be full rankings of all items, just the top-t rankings, or a series of pairwise comparisons. Our examples come from various areas, including sport and genomics. This is joint work with Øystein Sørensen, Valeria Vitelli and Elja Arjas.

Pavel Grabarnik (gpya at rambler.ru)

Title: Spatial complexity of ecosystems: testing models for spatial point patterns

Abstract: Goodness-of-fit tests play a fundamental role in ecological statistics and modeling. Testing statistical hypotheses is an important step in building models. Often it is checked whether the data deviate significantly from a null model. In spatial point pattern analysis, typical null models are complete spatial randomness, independent marking or some fitted model. Unlike in classical statistics, where null models are usully represented by a single hypothesis, the hypotheses in spatial statistics have a spatial dimension and therefore a multiple character.

The classical device to overcome the multiple comparison problem in testing a spatial hypothesis is the deviation test, which summarizing differences between an empirical test function and its expectation under the null hypothesis, which depend on a distance variable. Another test is based on simulation envelopes, where a data functional statistic is inspected for a range of distances simultaneously. It was noted that type I error probability, when testing over an interval of distances, exceeds that for individual scales heavily, and therefore, the conventional pointwise simulation envelope test cannot be recommended as a rigorous statistical tool.

To overcome this drawback the refined envelope test was proposed in (Grabarnik et al., 2011) and developed futher in a recent work (Myllymäki et al.,2013). It is a procedure where the global type I error probability is evaluated by simulation and taken into account in making conclusions. In this way, it becomes a valuable tool both for statistical inference and for understanding the reasons of possible rejections of the tested hypothesis.

A problem related to testing a goodness-of-fit of fitted models is that the test may be extremely conservative. The remedy is the procedure proposed by Dao and Genton (2013). Based on their idea we suggest a way how to adjust envelopes to make the empirical type I error equal to the nominal one. We illustrate the applicability of the tests by examples from forest ecology.

Reference.

Dao, N. A., & Genton, M. G. (2013). A Monte Carlo adjusted goodness-of-fit test for parametric models describing spatial point patterns. Journal of Computational and Graphical Statistics, 23, 497-517.

Grabarnik, P., Myllymäki, M. Stoyan, D. (2011). Correct testing of mark independence for marked point patterns. Ecological Modelling 222, 3888-3894.

Myllymäki, M., Mrkvicka, T., Seijo, H., Grabarnik, P. (2013). Global envelope tests for spatial processes. arXiv preprint arXiv:1307.0239.

Peter Guttorp (peter at stat.washington.edu)

Title: On point process history

Abstract:

Anders Hildeman

Title: Classification of epileptic seizures using accelerometers

Abstract: Epilepsy is a neurological disorder that affects a large group of people around the world. The research institute IMEGO has developed a hardware setup for measuring and logging acceleration of limbs on patients suffering from epilepsy. Signal analysis methods are applied to the acceleration data to register when a seizure occurs. In this thesis, the existing seizure classification methods are enhanced by studying the time evolution of the acceleration data over time spans of several minutes around each discrete sample point in time. This is achieved by clustering data and examining the cluster transitions between data points that are close in time. In this work several clustering, classification and dimension reduction techniques are presented. Moreover, a pilot study that assesses the performance of the proposed classification method under a wide variety of parameters, input data and data transformations is implemented. The old classification method that was used prior to this thesis is also evaluated and compared against the new ones. The pilot study shows that the proposed classification method performs better than the method implemented prior to this work. The proposed method performs well on tonic-clonic epileptic seizures even with an otherwise active movement profile during the measurements. For strictly tonic seizures, however, the pilot study gives no promising results. It seems like the classification methods are not able to distinguish a tonic seizure from normal activity. The optimal parameters of the proposed method seems to differ depending on the kind of seizure and background data that is studied. In a real application, tuning the parameter model for the appropriate patient behavior seems to be necessary for adequate classification performance. During the measurements, acceleration measurements from three positions on the body were analysed. The pilot study reveals that in many cases, not all three positions are necessary. Which ones that are important to keep depends on the specific patients seizure behavior.

Xiangping Hu (xiangph at math.uio.no)

Title: Multivariate Gaussian random fields with SPDEs

Abstract: In this talk I will discuss how to use systems of SPDEs to build multivariate Gaussian random fields. We will show that with the SPDE approach, we can theoretically build valid multivariate models, i.e., the non-negative definite constraint is fulfilled automatically. With sequential approach on some settings, we can achieve fast and robust inference.

Henrike Häbel (henrike.habel at chalmers.se)

Title: Spatial modeling of micro-structure in porous material

Abstract: Modeling the micro-structure of a material is crucial for controlling and understanding its properties and function. Here, the water permeability of porous films used as pharmaceutical coatings for controlled drug release are studied. The drug release is associated with the degree of water permeability of the film which, in turn, is defined by its porosity. In this study, the films are formed by blending two polymers, namely Ethyl cellulose (EC) and Hydroxypropyl cellulose (HPC), where the films porosity depends on the percentage of dissolved and leaked HPC. In a previous two-dimensional image analysis of the pore structure it has been shown that the pore shape was one of the important factors influencing the permeability of the film. The current challenge is to develop suitable methods for modeling the pore structure to be able to analyze simulated films. In particular, the question arises how one can use inference from two-dimensional images for modeling three-dimensional structures. In particular, the pore structure will be modelled by marked point processes, where the marks are some shape parameters and the points can correspond to centres of the pores or locations of skeleton branching points, for instance. In order to account for heterogeneity and correlation, the chain like structure of the HPC pores can be constructed based on continuum percolation or by involving Markov chains.

In my talk, I would like to present some approaches to the challenge of modeling the micro-structure in porous material based on the methods mentioned above. This is joint work with Mats Rudemo and Aila Särkkä.

Alex Lenkoski (Alex.Lenkoski at nr.no)

Title: Bayesian hierarchical modeling of extreme hourly precipitation in Norway

Abstract: Spatial maps of extreme precipitation are a critical component of flood estimation in hydrological modeling, as well as in the planning and design of important infrastructure. This is particularly relevant in countries such as Norway that have a high density of hydrological power generating facilities and are exposed to significant risk of infrastructure damage due to flooding. In this work, we estimate a spatially coherent map of the distribution of extreme hourly precipitation in Norway, in terms of return levels, by linking generalized extreme value (GEV) distributions with latent Gaussian fields in a Bayesian hierarchical model. Generalized linear models on the parameters of the GEV distribution are able to incorporate location-specific geographic and meteorological information and thereby accommodate these effects on extreme precipitation. A Gaussian field on the GEV parameters captures additional unexplained spatial heterogeneity and overcomes the sparse grid on which observations are collected. We conduct an extensive analysis of the factors that affect the GEV parameters and show that our combination is able to appropriately characterize both the spatial variability of the distribution of extreme hourly precipitation in Norway, and the associated uncertainty in these estimates.

Jan Lennartsson (jan.lennartsson at chalmers.se)

Title: A spatio-temporal precipitation generator induced by a censored latent Gaussian field

Abstract: A daily stochastic spatio-temporal precipitation generator that yields precipitation realisations that are quantitatively consistent, is described. The methodology relies on a latent Gaussian field that drives both the occurrence and intensity of the precipitation process. For the precipitation intensity, the marginal distributions, which are space and time dependent, are given by a composite model of a gamma-distribution for observations below some threshold together with a generalized Pareto distribution describing the excesses above the threshold. Statistical parameters are estimated from data and extrapolated to locations and times with no direct observations using Delanay trianglulation. One advantage of such a model is that stochastic generator parameters are readily available at any location and time of the year. The methodology is illustrated on a data set of daily rainfall values from Sweden. Performance of the model is judged through its ability to accurately reproduce a series of weather indices and spatial dependence measures.

Finn Lindgren (finn.lindgren at gmail.com)

Title: Boundary adjustment methods for SPDE models

Abstract: When using stochastic partial differential equations to construct Markov random field models for spatial statistics, the issue of boundary effects needs to be considered. Sometimes, the underlying problem may dictate zero normal derivatives along the boundary of a well-defined physical domain. In other cases, the study area is only a part of a larger domain, and does not physically end where the model ends. In such cases, more general boundary behaviour is desirable, for example in order to model a subregion of a stationary random field, or to have different behaviour along sections of the boundary. Several methods for accomplishing this are presented, with varying degrees of generality and practical applicability.

Longfils Marco

Title: Generalized Eden Model

Abstract: In 1961 Eden introduced a growth model that is perhaps the simplest that can be defined. It was originally proposed as a biological growth model for describing the formation of a cell colony, such as bacteria cultures. The basic assumptions of the model are that cells only grow at the periphery of the cluster and the colony is always connected. Shortly, it can be explained in the following way: at time zero all the points of the integer lattice are at state 0, except the origin, which is at state 1; At each time only a point can change its state ; If a site is at state 1 at time n, it remains in this state at all future times; if a site z is 0 at time n and all its neighbours are in the state 0, then z remains at state 0 at time n+1; if a site z is at state 0 at time n and at least one of its neighbours is at state 1, then z will change to state 1 with probability proportional to the number of its neighbours in state 1.

Anton Muratov (muratov at chalmers.se)

Title: Segment recombinations and random sharing models.

Abstract: Consider a renewal point process on the line and divide each of the segments it defines in proportion given by i.i.d. realisations of a fixed distribution supported by [0,1]. Now recombine the obtained pieces of the segments by joining the neighbouring ones, so that the division points are now the separation points between the new segments. We ask ourselves for which renewal processes and which division distributions the division points follow the same renewal process distribution? An evident case is that of equal length segments and a degenerate division distribution. Interestingly, the only other possible case is when the increments of the renewal process is Gamma and division points are Beta-distributed. In particular, the division points of a Poisson process is again Poisson, if the dividing distribution is Beta(r,1-r) for any $0<r<1$.

We show that a similar situation arises in the random sharing model when a countable number of `cited' exchange randomly distributed parts of their `wealth' with neighbours. More generally, Dirichlet distribution arises in these models as the distribution leading to the fixed point. We also show that the fixed points of the random sharing are attractors meaning that starting with a non-equillibrium configuration distribution will converge to the equilibrium.

Krzysztof Podgorski (krys.podgorski at gmail.com)

Titel: Slepian models for moving averages driven by a non-Gaussian noise
(joint with Rychlik, I. and Wallin, J.)

Abstract: Slepian models are derived describing the distributional form of a stochastic process observed at level crossings of a moving average driven by a Laplace noise. The approach is through a Gibbs sampler of a Slepian model for the Laplace noise and it allows for simultaneously studying a number of stochastic characteristics observed at the level crossing instants. A method of sampling from the corresponding biased sampling distribution of the underlying gamma process is also obtained from the same Gibbs sampler.

This is used for efficient simulations of the behavior of a random processes sampled at crossings of a non-Gaussian moving average process.

It is observed that the behavior of the process at high level crossings is fundamentally different from that in the Gaussian case, which is in line with some recent theoretical results on the subject. The approach is applied to study vehicle responses to encountered road roughness and it is demonstrated that accounting for non-Gaussian character of the road models has a significant impact on the vehicle component behavior at extreme events. Basically, the shape of extreme episodes resembles the (asymmetric) kernel while for Gaussian model the shape is given by the correlation function of which is symmetric in time.

Tuomas Rajala (tuomas.rajala at iki.fi)

Titel: Noise points in large point patterns: mean field inference

Abstract: Large point pattern datasets tend to include noise points due to e.g. material deformation or imaging. In this talk I will discuss noise point classification when the base pattern is assumed repulsive and the posterior class probabilities are derived using the mean field approximation (aka variational Bayes). Motivating example discusses noisy 3D air bubble patterns in polar ice core samples.

Claudia Redenbach (redenbach at mathematic.uni-kl.de)

Title: Spatial statistics for the analysis of polar ice cores

Abstract: We discuss methods for the analysis of anisotropic marked point processes which are motivated by the investigation of the pore system in ice cores. These cores are drilled from the Antarctic ice shield and consist of compacted snow. During the compression process, air pores are isolated within the ice. The system of these pores can be analysed using tomographic images. In earlier work, directional versions of the K-function and the nearest neighbour distance distribution function were used to analyse the anisotropy of the ice. It was shown that the spatial arrangement of the pores yields information on the compaction and the flow of the ice shield.

However, directional analysis is hampered by the fact that some extra pores form due to relaxation when the ice core is taken out of the drilling hole. These do not carry any information on the movement. Hence, they should be detected and removed prior to the directional analysis. For that purpose, we assume that the pattern of true pore centers is a realization of a regular Strauss point process, while the centers of noise pores can be modelled by a Poisson process. The aim is to decide which of the two processes each pore belongs to. To this end, we construct an MCMC algorithm which estimates the parameters of the mixture model and obtains posterior probabilities for each point of being a Strauss point. Based on these, the points can be classified.

Joint work with Johannes Freitag, Aila Särkkä, Martina Sormani, Tuomas Rajala, and Katja Schladitz.

Holger Rootzen (hrootzen at chalmers.se)

Title: Multivariate Peaks over Thresholds modelling

Abstract: Quite a number of different approaches to multivariate Peaks over Thresholds modelling has been proposed in the literature. Most of them are based on multivariate generalizations of the Generalized Pareto distribution, but other approaches have also been proposed. This talk will review and discuss some of these approaches. Further, work in progress on new parametric multivariate Generalized Pareto models will be presented. These models have tractable likelihoods and permit use of the entire standard maximum likelihood machinery for estimation, testing, and model checking.

Mats Rudemo (rudemo at chalmers.se)

Titel: Single particle analysis of raster image spectroscopy data

Abstract: In raster image spectroscopy of fluorescent particles image lines are scanned consecutively. Particles with a high diffusion coefficient move between consecutive line scans and the established analysis method for estimating diffusion coefficients, called RICS (Raster Image Correlation Spectroscopy), is based on computation of the empirical correlation function of the observed image. In this talk a method based on tracking individual particles with the unknown trajectory in three dimensions treated as unobserved data and estimated by Markov chain Monte Carlo methods is discussed. Compared to RICS, this method may be more effective at low particle concentration levels when the overlay of different observed particle trajectories is small. The talk describes work in progress in cooperation with Erich Schuster and Niklas Loren at SIK (the Swedish Institute for Food and Biotechnology).

Igor Rychlik (rychlik at chalmers.se)

Titel: Variability of wind speed encountered by a vessel

Abstract: Wind speeds are modeled by means of a transformed Gaussian process, where a power transformation is applied. Its dependence structure is localized by introduction of time and space dependent parameters in the covariance function. The model has the advantage of having a relatively small number of parameters. These parameters have natural physical interpretation and are statistically fitted to represent variability of observed wind speeds in ERA Interim reanalysis data set. The model is validated using the on-board measured wind speeds on vessels sailing in Northern Atlantic.

Aila Särkkä (aila at chalmers.se)

Title: Stochastic modeling of eye movements

Abstract: Eye movements are outcomes of cognitive processes in the human brain, and can be recorded with high spatial and temporal resolution by computerized eye trackers. Eye movements give valuable information on cognitive processes and are therefore, used in many areas. Here, the question of interest is how people look at art. The data come from a cognitive art research experiment, where the eye movements of twenty test subjects were recorded while they were looking at six paintings, each painting during three minutes. We will concentrate on studying the eye movements on one of the six paintings, namely Koli landscape by Eero Järnefelt.
Eye movements can be represented as an alternating sequence of fixations (periods in which the gaze is staying relatively still around a location of the target space) and saccades (rapid movements between the fixations). We view the process of fixations as a spatio-temporal point process and introduce models for the spatio-temporal eye movement process including fixation locations, fixation durations, and saccade durations and lengths.

This is joint work with Anna-Kaisa Ylitalo (University of Jyväskylä) and Peter Guttorp (University of Washington).

Thordis Thorarinsdottir (thordis at nr.no)

Title: Joint probabilistic forecasting of temporal trajectories of regional wind and solar power production

Abstract: Renewable energy sources provide a constantly increasing contribution to the total energy production worldwide. However, the power generation from these sources is highly variable due to their dependence on meteorological conditions. Accurate forecasts for the production at various temporal and spatial scales are thus needed for an effective electricity market. We propose fully probabilistic prediction models for spatially aggregated wind and solar power production at an hourly time scale with lead times up to several days using weather forecasts from numerical weather prediction systems as covariates. After an appropriate transformation of the power production, we build up a multivariate Gaussian prediction model under a Bayesian inference framework which incorporates both the temporal error correlation for each energy source as well as the correlation between the two sources. Recently proposed simulation methods for G-Wishart variates allow us to efficiently compare several alternative formulations of the correlation structure. We furthermore compare the predictive performance of a full single-stage model versus a two-stage copula model.

Joint work with Anders Løland and Egil Ferkingstad.

Jonas Wallin (jonas.wallin81 at gmail.com)

Title: Multivariate latent Gaussian random field mixture models

Abstract: In this talk, I will introduce the model class denoted latent Gaussian random field mixture models. The model combines Markov random field mixture models with latent Gaussian random field models. The latent model, which is observed under measurement noise, is defined as a mixture of several, possible multivariate, Gaussian random fields. Which of the fields that is observed at each location is modeled using a discrete Markov random field. In order to use the model class for massive data sets that arises in many possible areas of application, such as brain imaging, a computationally efficient parameter estimation method is developed. Finally, the model is tested on a magnetic resonance imaging application.

Bernt Wennberg (wennberg at chalmers.se)

Title: Propagation of chaos for N-particle Markov jump processes

Abstract: The Boltzmann equation is a mathematical model for a dilute gas, and describes the evolution of the statistical distribution of one independent particle in phase space. Its derivation depends on what Boltzmann called the "stosszahlansatz", or chaos property, which essentially states that two colliding particles are statistically uncorrelated before engaging in the collision. For a realistic gas, this has been rigorously proven to hold only in particular cases, and for a very short time. However, there are rigorous proofs for a number of Markov jump processes that mimic the behavior of a real gas. In this talk I will give the background to the notion of "propagation of chaos" and present some recent results.

Anna-Kaisa Ylitalo (anna-kaisa.ylitalo at jyu.fi)

Title: A sequential point process model for eye movement data

Abstract: Electronic eye trackers record spatial locations of the gaze, as well as the corresponding time instances when the gaze moves while person is looking at a target. Ideally, such data can be expressed as a sequence of jumps in two-dimensional space with associated times of occurrence. The gaze locations are called fixations and the jumps between them saccades. Eye movement sequence can now be thought as spatio-temporal data which is in our case inhomogeneous in space and time.

We suggest a finite sequential point process model for saccades in eye movement data. The new statistical model takes the global and local features of an eye movement data into account, such that it models saccades, heterogeneity of the target space and the coverage of the eye movements simultaneously. The model is needed in the determination of uncertainties for summary statistics and testing various effects. A data set belonging to the field of art study is used as an empirical example.

This is joint work with Antti Penttinen (University of Jyväskylä).

Sergey Zuyev (zuev at chalmers.se)

Title: Bursty spatial point processes and their inference.

Abstract: A recent challenge in modelling contemporary complex systems is to take into account an often observed burstiness when the structures at different even close locations may differ drastically. Modelling temporal bursty phenomena, such as the internet traffic, gave rise to development of models based on fractional Brownian motion and Levy processes, while spatial burstiness has hardly been addresses so far. To take into account extreme spatial variability, we study thinning-stable point processes. They can be considered as a generalisation of discrete-stable integer random variables, this is why they are also called discrete alpha-stable point processes, or DaS. DaS processes arise as a limit in superposition-thinning of iid point processes. When the intensity measure of the thinned point processes exist, the limit is a Poisson process. However, in the case when intensity measures of the summands assume infinite values, the limit is DaS which manifests in a bursty structure. By using recent results on the cluster representation of DaS processes we develop statistical tools to estimate their parameters: the exponent alpha, intensity of cluster centres and the spectral measure governing the distribution of the underlying Sibuya point process.