

DEPARTMENT OF MATHEMATICS AND STATISTICS
MISSISSIPPI STATE UNIVERSITY

COLLOQUIUM

Some New Statistical Models in Climatology

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Allen 14

Abstract. High-resolution satellite precipitation estimates, such as the popular CMORPH product, provide gauge alternative sources of precipitation data, especially in regions where adequate ground-based instruments are unavailable. These estimates are, however, subject to large errors, especially at times of heavy precipitation. A method to probabilistically transform a set of CMORPH estimates into the more accurate precipitation ground-based radar (NEXRAD) values is introduced. As our concern lies with floods and extreme precipitations, a peaks over threshold extreme value approach is adopted that fits a Pareto distribution to the large precipitation estimates. A simple distributional transformation result is then used to match the two sets of estimates. We also consider some new problems in changepoint analysis. A changepoint (also called breakpoint) is a time of discontinuity in the structure of a time series of data. A series could experience a change in first moment, variance, or even in distribution. Statisticians now recognize the importance of changepoints in inferential aspects of statistical analysis. Many changepoints, particularly in climate settings, manifest themselves as level shifts in the mean of a stochastic process. Trend detection in daily snow depth series undergoing such level shifts are examined, with results generalized to allow infinitely many parameter shifts at known times in a general linear model.

Dr. Woody is a candidate for a position in our department. There will be a reception for him in Allen 467 at 3:00 pm.

Contact Jan DuBien, dubien@math.msstate.edu or (662) 325-7157, for additional information.