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SPARC Data Initiative: Distilling the salient features in differences between satellite-based measurements of stratospheric chemical composition

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One goal of the SPARC data initiative is to conduct an assessment of the available data sets of stratospheric trace gases, including a detailed inter-comparison of compiled chemical composition climatologies. Such assessments inevitably lead to improvements in the underlying data sets with the result that frequent updates to the assessments are required. Despite their necessity, cyclical updates of assessments are seldom done since considerable time and effort is invested in each assessment to extract the salient features of the differences between the data sets being evaluated. This presentation explores techniques that might be used to automatically make inferences about the relations between the different data sets. For example, regression model fits to differences between two data sets, expanded in Fourier series to account for seasonality and in Legendre polynomials to account for latitudinal dependence, quantitatively capture the large scale features of the difference fields. Based on statistically significant fit coefficients, or on the largest regions where the regression model shows statistically significant differences from zero, statements can be made about the differences between the two data sets being compared. Examples of the performance of such an automated evaluation scheme will be given.