



Severe weather data in Geographic Information Systems: What formatting details make satellite data useful in GIS?

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Observations from NASA satellites are often distributed as gridded data or swath data in the HDF format, a format that is difficult or impossible to display in many GIS applications. In an effort to make satellite data from the Tropical Rainfall Measuring Mission (TRMM) and the Global Precipitation Measurement (GPM) mission more useful to GIS users, we have prototyped files in two GIS formats: geoTIFF and Google Earth's KMZ format. We are also exploring converting HDF data into the GIS shapefile format. In the future, GIS formats are expected to be generated by the Precipitation Processing System (PPS) that generates standard data products for TRMM and GPM. To make these files more useful in GIS applications, we request suggestions on how to improve the formatting details of these files. Sample GIS files are available at [<http://www-tsdis.gsfc.nasa.gov/>].

For applications in realtime weather monitoring and disaster response, the geoTIFF format may be a useful GIS format for storing precipitation data. GeoTIFF is a widely used format and can contain a single, two dimensional gridded variable. The variable can either be stored as a "ready to display" image with color table or as the actual observations in physical units. We show an example of how swath data can be converted into a gridded image and stored in a geoTIFF file. Our example is a severe weather event observed by TRMM. We will also show a geoTIFF image of the TRMM 3B42 gridded 3-hour precipitation field over the entire Tropics.

For outreach purposes, the Google Earth GIS application is a useful tool because it is interactive and is freely available. An informal web search suggests that, currently, Google Earth is only being used to project two dimensional images onto the surface

of the Earth. Google's KMZ format, however, is capable of defining multiple semi-transparent three-dimensional volumes. Taking advantage of this capability, our three dimensional KMZ files show how observations from multiple instruments increase our understanding of the processes at work in severe weather events. These KMZ files contain cloud top height, 3D precipitation volume, surface rain rate, and lightning flash locations. A program written in the IDL language translates data from HDF and other archival data formats into Google Earth's KMZ format.