INCORPORATING AMERIFLUX DATA INTO LVT

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Abstract— This paper describes a new generic data reader that was developed in Fortran to handle the Ameriflux data for the LIS Verification Toolkit (LVT). Researchers at the Hydrological Sciences Branch of NASA Goddard Space Flight Center have created a high resolution land surface modeling and data assimilation system known as the Land Information System (LIS), which provides an infrastructure to integrate state-of-the-art land surface models, data assimilation algorithms, observations of land surface from satellite and remotely sensed platforms to provide estimates of land surface conditions such as soil moisture, evaporation, snowpack and runoff. These model predictions are typically evaluated by comparing them with data from observational networks. The observational data; however, are usually available in disparate data formats and require significant effort to process them into a structure amenable for use with the model data. The motivation to develop a uniform approach for land surface verification as a way to alleviate these processing efforts has led to the development of LVT which is designed to enable the rapid evaluation of land surface modeling and analysis products from LIS.

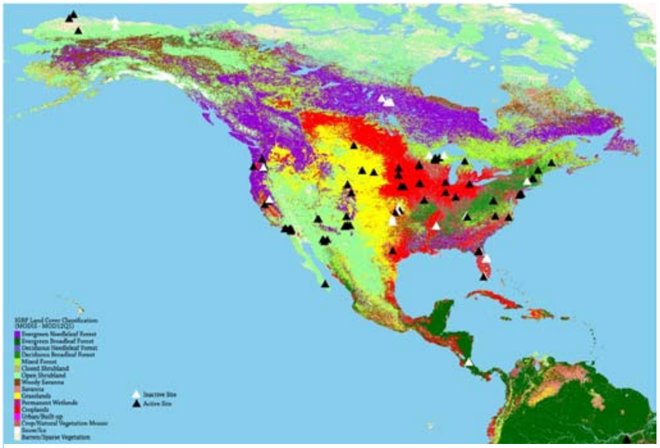

Figure1 shows a map showing Ameriflux stations across the continents. Note that locations are present in South America as well as North.

LVT focuses on the use of observational datasets in their native format. As the formats of these datasets vary widely, a major part of LVT is creating programs to read and process the native datasets. The primary goal of this project is to enhance LVT capabilities by incorporating observational datasets from Ameriflux (http://public.ornl.gov/ameriflux/).
As part of this project, a generic data reader was developed in Fortran to handle the Ameriflux data. These routines read the datasets in the native format, and temporally and spatially maps the observations to the modeling grid. Additional quality control and diagnostic checks are also applied during the data processing. The site-specific conventions associated with the reporting times (local vs. UTC), soil profile information are also handled generically within the programs. The data has been incorporated successfully and can now be used to evaluate LIS model simulations and to generate

comparisons of latent heat flux, sensible heat flux, soil moisture, soil temperature and precipitation. A few sample comparisons from the use of LVT against a LIS simulation is shown in Figures 2 and 3. Both figures had curves offset by 6.5 hours before correcting for a phase shift due to a difference in convention. A method in the reader file now corrects for this. The data has been incorporated successfully and can now be used to improve LVT. On most graphs, the predictions by the model match closely with Ameriflux's data, showing that the program works well.

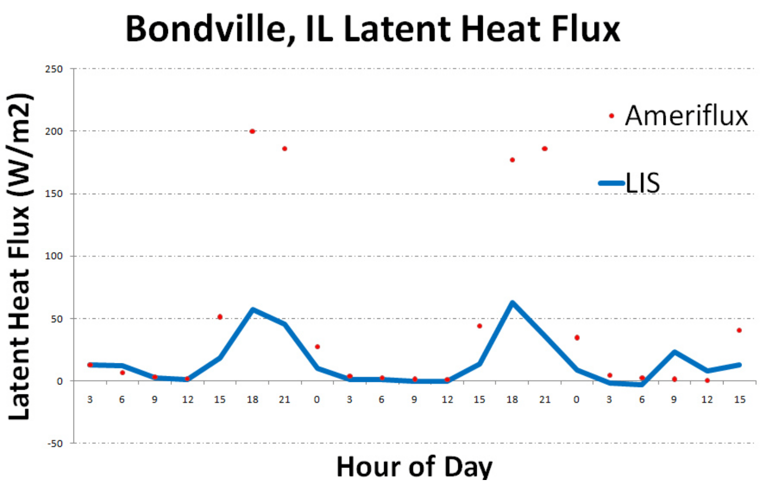

Figure 2, Latent Heat Flux in Bondville, IL. This displays Ameriflux data corrected by the reader, initially, each point was offset six hours back. Once this phase shift was accounted for, the data matched in this and all other charts.

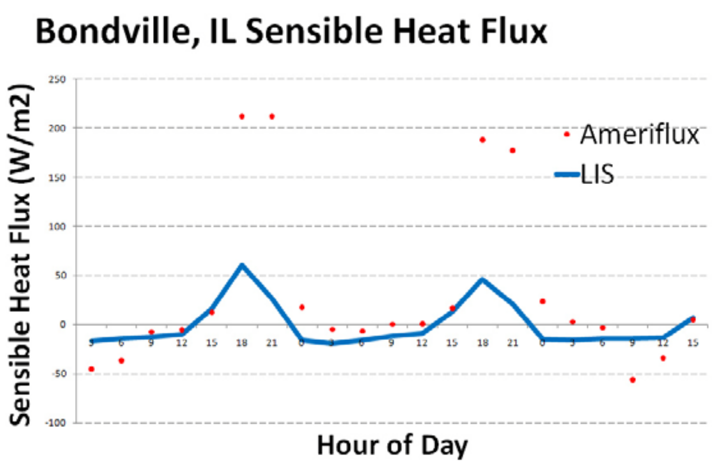

Figure3, Sensible Heat Flux in Bondville, IL. Again, the data is corrected for time shifts.

REFERENCES

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