

Dr. Jim Doyle (Advisory Committee Member, Head Mesoscale Meteorology Division, Naval Research Laboratory):

Excellent program, amazingly successful, extensive Fatima data base will be a great addition for modelers and process-level researchers, including for the latest NRL's NEPTUNE model which is under development (soon to be released). Years after Fatima, this dataset will be used, and hope it will be curated and repositied soon. In the short term, NRL scientists such as Alex Rudnick and Sasa Gabersek are using data assimilation studies for operational modeling., and Fatima data is a useful addition to the data base.

Attention ought to be paid to data curation and long-term repositing, if we were to get the maximum impact.

Focus on turbulence as a central player of the project is to be commended, as microphysics continue to be a difficulty for modeling and prediction. Several advances on this aspect has been made during Fatima such as how very small scale turbulence modulate aerosols.

Demonstration of new technologies as well as ESTCP proposal with Honeywell is a highlight of the project. It is exemplary to develop such collaboration which serves the expectations of a MURI project. In addition, collaboration with NRL Monterey is an added value – so many spin ups of the project. Commissioning NRL to run COAMPS to guide all three Fatima field studies is a noteworthy partnership.

Multi-scale and multi-physics problems such as fog has been a long-held problem in geophysical modeling. Especially difficult are the small-scale processes such as fog-aerosol-turbulence-radiation interaction. Physics delineated can be extremely useful in developing simple parameterizations and improved prediction. The program addressed several such issues through intricate measurements, which may find way to models via parameterizations. Fog shadow is one example. Such parameterizations may help transition of Fatima finding for operational predictions.

Future opportunities abound for AI applications to bolster operational forecasting. The Honeywell-Fatima ESTCP connection will be a good opportunity to test how Fatima data will be useful in improving short-term forecasting through AI applications. Fatima data can be supplemented by other data taken from the study domains (e.g., smart buoys) to improve the data propensity.

Multidisciplinary of the project need to be commended. From the onset, the group has enlisted aerosol scientists of all walks – chemical, biological and physical. Atmospheric scientists, oceanographers, physicists, aerosol scientists, engineers and applied mathematicians with strong numerical grounding has worked together in the project.

Dr. Andrew Heymsfield (Advisory Committee Member, Senior Scientist at NCAR)

Excellent project, very productive, and have only a few comments beyond already provided in previous meetings. Would like to reiterate the importance of vertical velocity measurements, air parcel as well as droplet velocities. These will be helpful in CCN activation studies, assessing radiative cooling of droplets and well as droplet deposition and re-entrainment. Through the project, the PIs have developed and amassed an array of remote and in situ sensors, which we hope will take the probing of microphysics to a new level.

Dr. Matt Wilbanks (Advisory Committee Member, Meteorologist, Naval Surface Warfare Center Dahlgren Division)

Will be available in due course.