Review of the proposal entitled “Global Chemistry and Aerosol Predictions for Improved Prediction of Long Range Pollution Transport with FV3” with ID of 2777689 by R. Bradley Pierce (PI) etc.

General comments: This project is aimed at improving the NAQFC predictions of surface O3 and PM2.5 by refining the lateral boundary conditions (LBCs) through updating the emissions for both RAQMCHEM and GSDCHEM. However, the proposal is limited to the impact of the improved LBCs on the NAM-CMAQ air quality forecasting system of which the NAM is scheduled for decommissioning in 2021 and NOAA is moving entire operational modeling suite toward the models built on finite-Volume Cubed-Sphere (FV3) dynamical core. In addition, OWAQ has funded a project to improve the current LBCs conditions that are used in the operational version of NAQFC. This proposal is used to address the Air Quality Research and Forecasting (AQRF) Priorities 3 and 5. But the benefit of this proposal work to the NAQFC will be limited.

Specific comments for each scoring item are provided below.

1. Importance/Relevance and Applicability of Proposed Project to Program Goals: 21 points

Comments: The proposal has clearly identified a clear problem that later boundary conditions (LBCs) are critical to the NAQFC predictions for both surface O3 and PM2.5 especially during the wildfire and dust events. The proposal will address the AQ Research and Forecasting (AQFS) Priorities 3 and 5 through tests with the NMMB-CMAQ AQ forecasting system. However, the benefits of this proposal to improve the NAQFC forecasts will be limited since the operational FV3GFS-driven NGAC (NEMA Global Aerosol Component) predictions have been used to generate the aerosol lateral boundary conditions to drive the current operational NAQFC which is based on the NMMB-CMAQ forecasting system. Moreover, a project which is similar to this proposal has been funded by the OWAQ program in 2016 through Award NA16OAR4590120.

1. Technical/Scientific Merits: 22.5 points

This proposal is aimed at improving surface O3 and PM2.5 predictions by providing more realistic lateral boundary conditions of gaseous and aerosol-phase species through updating anthropogenic and wildfire emissions for the FV3GFS-RAQMSCHEM and FV3GFS-GSDCHEM predictions. However, the aerosol lateral boundary conditions generated by operational NEMS GFS Aerosol Component (NGAC) predictions driven by FV3GFS have been using in the current operational NMMB-CMAQ forecasting system (i.e., NAQFC). Meanwhile, an ongoing project funded by the NOAA U.S. Weather Research Program (USWRP), Award # NA16OAR4590120 is working on improvement of chemical lateral boundary conditions for the NAQFC. The task plan proposed by this project is limited to the NAM-CMAQ system which has been scheduled to decommissioning and be replaced by the FV3-CMAQ system in 2020.

The proposal provides a clear schedule for task completion dates but no detail for the deliverables. It identifies statistical metrics for evaluating the success of the project and includes a feasible Data Management Plan.

1. Overall Quantifications of Application: 17 points

All the applicants have necessary education, experience of developing, testing and evaluating the AQEFS. The project can be accomplished through the effective collaborative arrangement and partnership.

1. Project Costs: 6 points

The applicants have provided a detailed project budget plan but the costs are much higher than others.

1. Outreach and Education: 3.5 points

The applicants have a feasible plan to share the data, present the results at the AMS and AGU, and submit a manuscript for peer-reviewed publication. The proposal does not promote the education and field experience of undergraduate and graduate students. No opportunities are developed in this proposal to share with K-12 educators