**“WGNE Intercomparison of Tropical Cyclone Forecasts by Operational Global Models: A Quarter-Century and Beyond”**

**Cover letter**

At the eight session of the Working Group on Numerical Experimentation (WGNE) in 1992, the Japan Meteorological Agency (JMA) presented verification results of tropical cyclone (TC) track forecasts of three operational global models. The WGNE recognized the importance of such a model validation study, especially for understanding the performance of the global models in the tropics and subtropics, and therefore encouraged the continuation of the verification. Since then, JMA has been reporting the latest verification results at every WGNE session. To this date, twelve global models have participated in the intercomparison.

As the WGNE marks 25 years since the start of this intercomparison, it is an opportune time to review the achievements of the project, and how much the accuracy of TC track forecasts by the global models has improved over the last quarter century at each TC basin.

A paper reviewing this intercomparison has never been submitted to any peer-reviewed journals, so this will be the first paper of the project. The emphasis of this paper will be to review the history of the project and to confirm our enhanced ability to predict TC positions over the past quarter century. The paper will finish with a section reviewing some challenges in TC track forecasting that have been identified at the 8th WMO International Workshop on Tropical Cyclones (IWTC).

We anticipate a length of about 3000-4000 words with up to 5-7 figures.

(232 words)

**Abstract**

Tropical cyclone (TC) track forecasts of operational global models have been compared and verified under the JSC/CAS Working Group on Numerical Experimentation (WGNE) since 1991. This intercomparison project has promoted validation of the global models in the tropics and subtropics. The results have demonstrated a steady increase in the global models’ ability to predict TC positions over the past quarter century.

The intercomparison study started from verification for TCs in the western North Pacific basin with three global models. Up to the present date, the verification has been extended to all ocean basins where TCs regularly occur, and twelve global models now participate in the project. In recent years, the project has been extended to include verification of intensity forecasts and forecasts by regional models.

This intercomparison project has seen a significant improvement in TC track forecasts, both globally and in each TC basin. In the western North Pacific, for example, the annual average position error of 4 day forecasts in recent years tends to be smaller than that in early 1990’s. The project has also demonstrated the benefits of multi-centre track forecasts (i.e., consensus forecasts).

Finally the paper considers future challenges to TC track forecasting by global models that have been identified at the 8th WMO International Workshop on Tropical Cyclones. We discuss the priorities and key issues in further improving the accuracy of TC track forecasts, reducing cases of large position errors and enhancing the use of ensemble information.

(241 words)