

**CLIMATOLOGICAL NORMALS for JMA EPS verification**  
Japan Meteorological Agency

1. Introduction

When calculating the verification measures for EPS associating with climatology, EPS producers should use reanalysis data as a climate. Climatological normals for the JMA medium-range EPS verification at 12 UTC are composed of the reanalysis data provided by JRA-25 (Onogi et al., 2007). In addition, JMA has a daily standard deviation of Z500, T850 and PMSL made from JRA-25 for the verification.

2. 12UTC climatological normals

- i) Data sources and period of daily climatological global fields  
1979-2004 : JRA-25
- ii) Data sources and period of daily global standard deviation  
1979-2004 : JRA-25

3. Calculation for normals

First, the data are averaged with the respective date for the period of 25 years. For the resultant of 365-day time series, weighted moving average is then conducted cyclically with 121-term weight factors by 60-day cutoff Lanczos lowpass filter (Duchon, 1979).

Reference

- Douchon. C.E., 1979 : Lanczos filtering in one and two dimensions, *J.Applied Met.*, 18, 1016-1022.
- Onogi, K., J. Tsutsui, H. Koide, M. Sakamoto, S. Kobayashi, H. Hatsushika, T. Matsumoto, N. Yamazaki, H. Kamahori, K. Takahashi, S. Kadokura, K. Wada, K. Kato, R. Oyama, T. Ose, N. Mannoji and R. Taira, 2007: The JRA-25 Reanalysis, *Submitted to J. Meteor. Soc. Japan.*