Angular dispersions of field and VGP from the models of paleomagnetic field

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Angular standard deviation (ASD) of paleomagnetic field reflects paleosecular variation (PSV), and is clearly dependent on the latitude of observation site. Among the various models of PSV, Constable and Parker (1988) first introduced a statistical model in which Gauss coefficients are zero mean random variables (except g10). Kono and his colleagues further developed a general model called a homogeneous background model, and pointed out the importance of g21 (h21). This study examines statistical models of PSV and inversion models of the mean paleomagnetic field by a computer simulation in which random numbers are given to each Gauss coefficient, and compares with the paleomagnetic observations.

Angular standard deviation (ASD) of paleomagnetic field shows clear variation to the latitude of the observation site; the higher the latitude, the smaller in field and the larger in VGP. Among the various models so far proposed to explain this feature, Constable and Parker (1988) first introduced a statistical model in which Gauss coefficients are zero mean random variables (except g10). Kono and his colleagues further developed a mathematical expressions of this model called a homogeneous background model (HBM), and pointed out that contribution of g21 (or h21) should be large to explain the latitude variation of ASD.

This study examines various statistical models of paleosecular variation (PSV) by a computer simulation in which random numbers are given to each Gauss coefficient. Importance of large variation in g21 (or h21) is so far ascertained, but we will also examine dependency of ASD on longitude of observation site. We will further apply the computer simulation to the models of time averaged paleomagnetic field which several authors studied by least squares methods. It is shown so far that the latitude variation of ASD is determined solely by how much variance is given to each Gauss coefficient as long as the model is close to an axial dipole field.