# Relationship between directional distribution of scatterometer-derived winds and errors in geophysical model functions

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**Abstract**

A simple model is developed in order to investigate relationships between errors in geophysical model functions (GMFs) and directional distributions of scatterometer-derived wind vectors, which are retrieved using the GMF. In the model, a set of normalized radar cross sections ($\sigma^0$s), which is expected to be observed by a scatterometer with a fixed frequency and combination of polarization and radar geometry (*i.e.*, incidence and azimuth angle), is calculated using an assumed 'true' GMF with constant wind speed and direction. Then wind vector is retrieved from the calculated $\sigma^0$s by using a GMF with known errors. By varying the wind direction relative to the radar geometry, we can examine systematic errors in the direction of retrieved wind vectors relative to antenna beams, and can simulate artificial directional preference caused by the errors in the GMF. This model is utilized to interpret artificial directivity of wind vectors of the NASA Scatterometer (NSCAT) preliminary wind data product, which were retrieved by the pre-launch model function, SASS-2. It is clearly shown that the directivity is caused by errors in directional components of the SASS-2 GMF.