

TECHNICAL NOTE

SOIL TECHNICAL NOTE NO. 2

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Guidelines for Interferometric Synthetic Aperture Radar (IFSAR) – Contour Intervals

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The creation and use of the Interferometric Synthetic Aperture Radar (IFSAR) digital terrain model (DTM) derived contour data by South Dakota (SD) Natural Resources Conservation Service (NRCS) Geographic Information System (GIS) users should not exceed (be smaller than) a three feet contour interval, unless the contours are for internal (NRCS) use only. **The IFSAR digital elevation model (DEM) data should never be used to determine absolute elevations to an accuracy of less than one meter.**

The use of IFSAR derived contours with a **contour interval tighter** than these specifications **will be allowed with these caveats**:

- The derived contours are for **NRCS internal** use only. In SD NRCS, we do not want to distribute information that doesn't meet our own levels of accuracy. If we do, it might be misconstrued as being official.
- **Maps** generated for use or **viewing outside the NRCS will not include these contours** for the same reason as above.
- The **contours will not** be used as a **sole source** for **boundary** digitization.

The ongoing acquisition and distribution of IFSAR digital elevation datasets in SD, including DTMs, allows GIS users to generate a variety of derivative products, including slope, aspect, hill shades, and contours. There is some confusion as to how tight of a contour interval is feasible when deriving contours from IFSAR DTMs.

Literature published by our IFSAR data provider, Intermap Technologies™, includes the following language:

“Contour Intervals - When determining the appropriate contour interval for a particular application, it is important to consider the application for which contours are needed. Different applications may require different contour intervals. One of the factors to consider is the slope of the terrain within the area of interest.

According to the National Standard for Spatial Data Accuracy (NSSDA) specification for contours¹, DEM data can be used to create contour data with an interval approximately 3.25 times the vertical accuracy (RMSE²) of the DEM.

While the published RMSE specification for Intermap's DEM data is 1 meter, the average RMSE is between 0.6 and 0.7 meters. Accordingly, Intermap's DEM data can be used to reliably generate contour data with an interval of 7 feet, or approximately 2.15 meters. While these are commonly accepted industry standards, **internal**

analysis has shown that *Intermap's DTM data (in unobstructed areas) can produce reliable contour data with an interval of 3 feet.*" (Emphasis added).

IFSAR derived contours with a contour interval tighter than these specifications is a generalization and interpretation of the data made by the computer. Therefore, they are not necessarily accurate. The contour values may not coincide with measurements made with more accurate data or instruments.

An example of the proper use of IFSAR derived contours with an interval of less than three feet would be to determine the landform of an area, e.g., the overall shape of a wetland. Using a 6-inch, 1 or 2 foot contour interval to delineate a boundary would be a misuse of the IFSAR data.

¹ David F. Maune, PhD, CP (ed.), *Digital Elevation Model Technologies and Applications: The DEM Users Manual*, 2d ed., American Society for Photogrammetry and Remote Sensing, 2007, p. 458.

² RMSE: the root mean square error is derived from a statistical formula for measuring the accuracy of our data against independently obtained "truth" data. The resulting RMSE value is a measure of the difference between these two sets of data.