

Initial System Differential Phase Offset/Correction, ST22

Running **STS > Calibration > Initial System Differential Phase** (ISDP) when there is light rain within 30 km of the radar will yield the best results. This routine should be performed when the PHI data are not near the expected target value of 60° and may be required after certain maintenance activities. The ISDP adaptation data value, ST22, can be evaluated by viewing PHI data at the near-edge of a rain region. The RPG is content if the visual average of PHI data (at the near-edge of rain) is close to 60°.

When the **RPG Estimated ISDP** is set to YES, the PhiDP data in the RPG are adjusted using the RPG-estimated ISDP*. The adjusted PhiDP data are used in subsequent RPG algorithms but do not impact the Super Resolution Differential Phase Data Array product (SDP) or the Level II data. When set to NO, the RPG-estimated ISDP is not used and the ISDP from the last RDA maintenance-adjusted setting is used. A setting of YES, in most conditions, will ensure the PhiDP data used in the algorithms are correct. This applies even when the RDA maintenance-adjusted ISDP may no longer be accurate. The RPG default value is YES. In addition, the RPG will send yellow RPG Status Log messages every volume when the PHI data differ from 60° by +/- 25° or more.

The results of ISDP are stored in ST22. ST22 may range from 0° to 359° and will vary from site to site and channel to channel for redundant systems. The ISDP routine calculates the offset value required to normalize PHI data to 60° so that the RPG receives PHI data values near 60° for rain on the near-side of a rainstorm.

ST22 has a linear inverse relationship with PHI. If ST22 is decreased by 7° then PHI data will increase by 7°. If ST22 is increased by 13° then PHI data will decrease by 13°. Saying another way, if PHI is too high, increasing ST22 will decrease PHI.

If you suspect PHI issues, please contact the Hotline. Also, you can refer to the *Initial System Differential Phase Procedure in EHB 6-513, Table 6-24*

** The RPG Estimated ISDP logic uses up to 200 radials and looks for the first 11 bins that have consecutive CC between 1.0 and 0.986. However, it will reject that radial if any of the 11 bins have Z > 40 dBZ or < 0 dBZ. Lastly, it will reject the radial if any of the 11 bins are within 25 km of the radar.*

Potential Impacts when Initial System Differential Phase (ISDP, ST22) is NOT Set to its Optimal Setting for your System

PHI at near-edge rain region may not be within ideal range



ZDR Attenuation Correction may be Incorrect → ZDR Degraded in AWIPS



Specific Differential Phase (KDP) may be Degraded



Hydrometeor Classification Algorithm may be Impacted

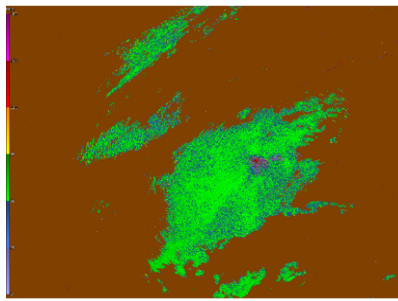


Quantitative Precipitation Estimates (QPE) may be Degraded

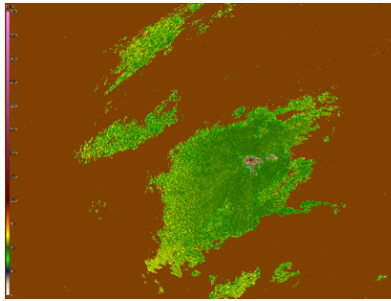
****** Examples of PHI ******

Recall that PHI is a Level II product that can be viewed in Gibson Ridge 2 Analyst (GR2A), NOAA Weather & Climate Toolkit (WCT), and AWIPS (23.2.2). The images of PHI that follow were obtained using GR2A. Currently, the WCT uses a similar color table to the modified color table shown in the middle image below, where blue is at 25 degrees.

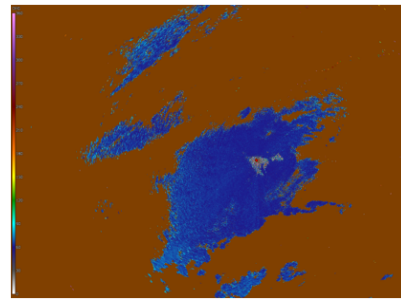
Illustrations of PHI for correct ISDP:



As displayed with the default color table in Gibson Ridge.

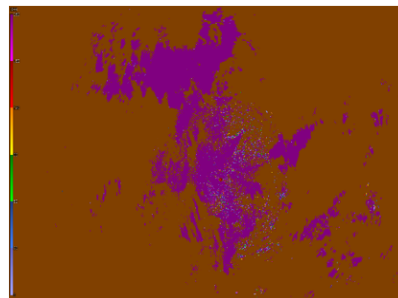


As displayed with a modified color table where 25 degrees is blue.

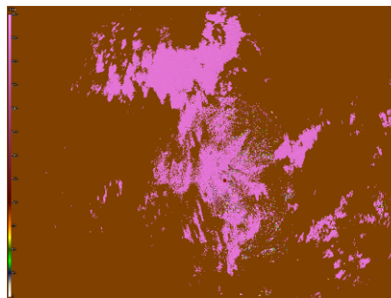


As displayed with a modified color table where 60 degrees is blue.

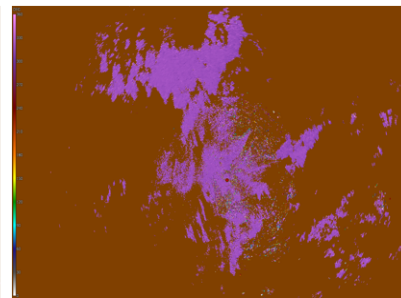
Illustrations of PHI for incorrect ISDP:



As displayed with the default color table in Gibson Ridge.

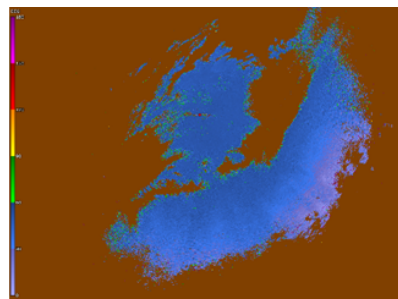


As displayed with a modified color table where 25 degrees is blue.

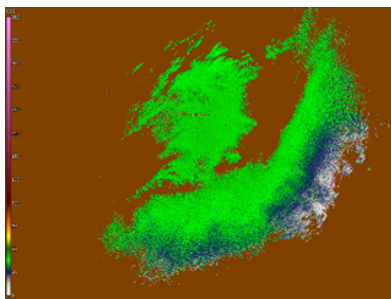


As displayed with a modified color table where 60 degrees is blue.

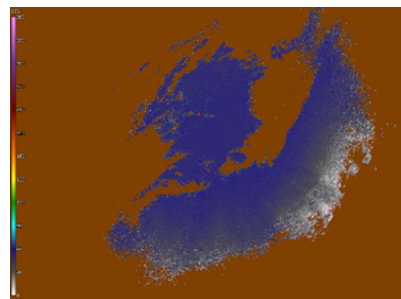
Illustrations of PHI for inverted ISDP:



As displayed with the default color table in Gibson Ridge.



As displayed a modified color table where 25 degrees is blue.



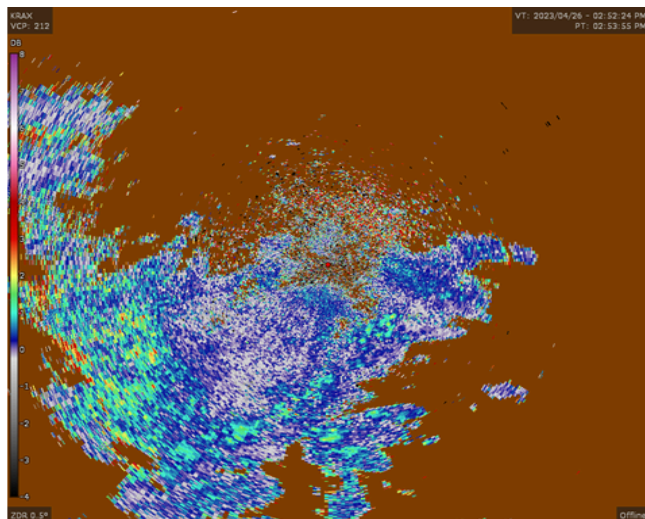
As displayed a modified color table where 60 degrees is blue

Inverted ISDP situations can arise when cables are incorrectly connected (i.e., H & V channel cables are swapped). As shown in the above example, swapping of the H & V channel cables will cause PhiDP to actually decrease with range. It is physically not possible for PhiDP to decrease with range.

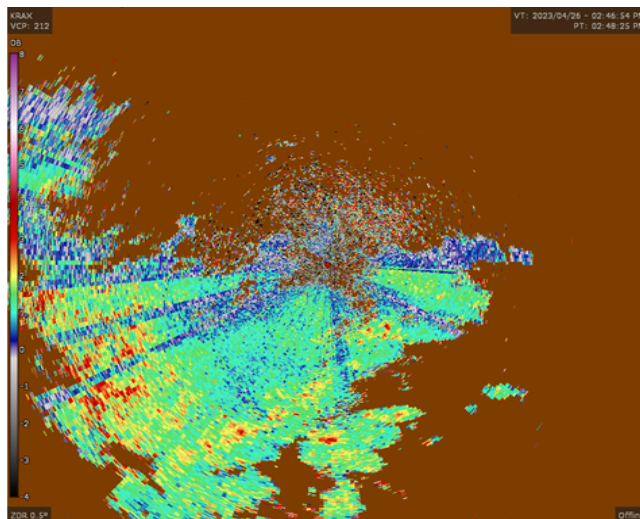
Impact Examples (Level III Products in GR3A)

Recall that ZDR from Level II will **not** be impacted by ISDP. This includes the “Raw ZDR” Product in AWIPS (23.2.2 or newer). The following examples are from Level III products.

Illustrations of ZDR at 0.5 degrees:

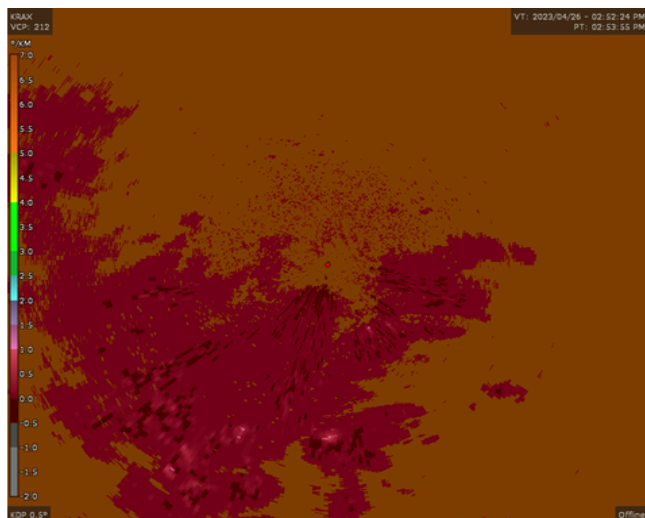


Example of ZDR with a correct ISDP.

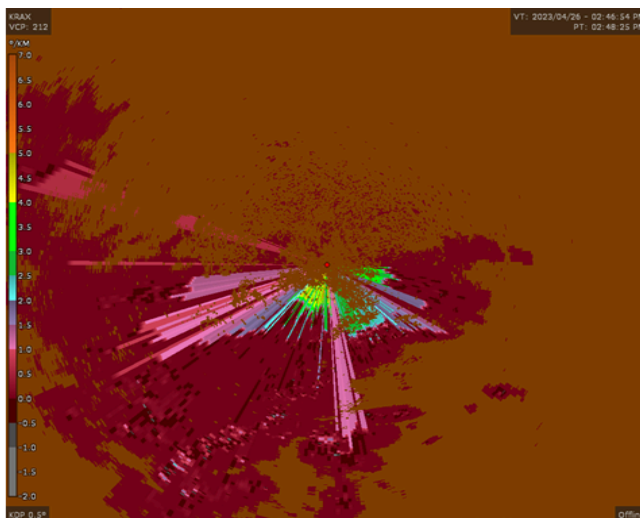


Example of ZDR with a incorrect ISDP.

Illustrations of KDP at 0.5 degrees:

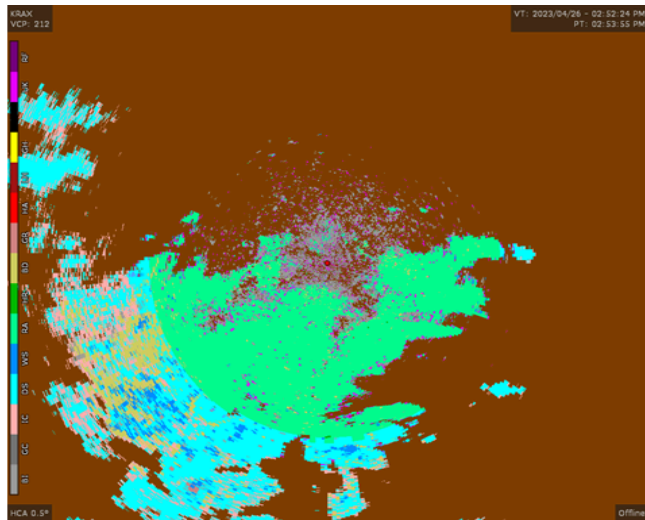


Example of KDP with a correct ISDP.

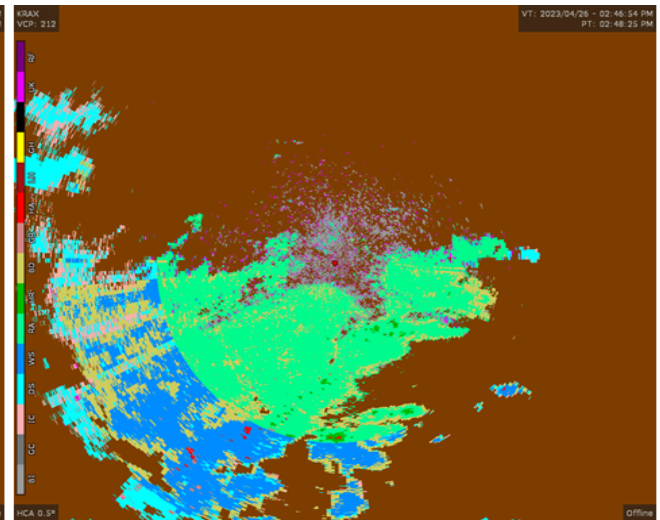


Example of KDP with a incorrect ISDP.

Illustrations of HCA at 0.5 degrees:

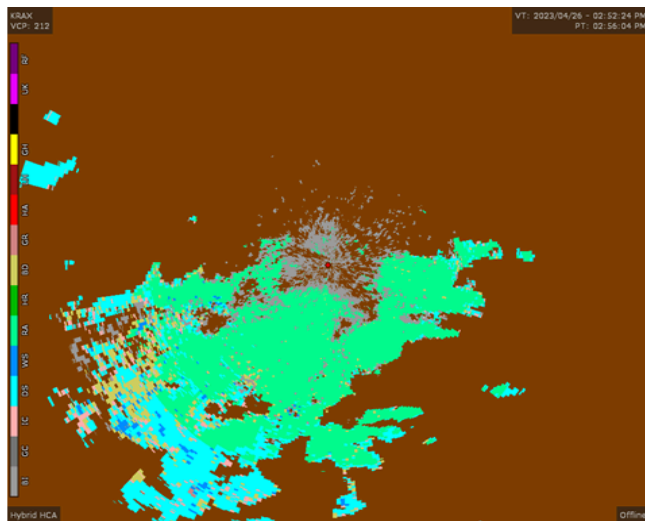


Example of HCA with a correct ISDP.

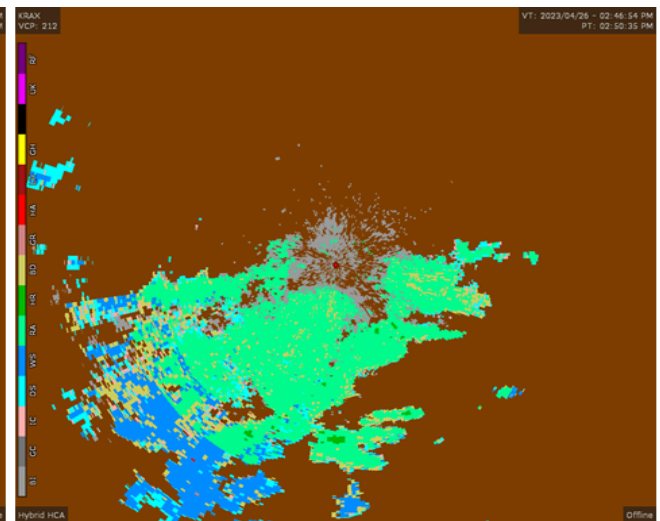


Example of HCA with a incorrect ISDP.

Illustrations of HHC:



Example of HHC with a correct ISDP.



Example of HHC with a incorrect ISDP.