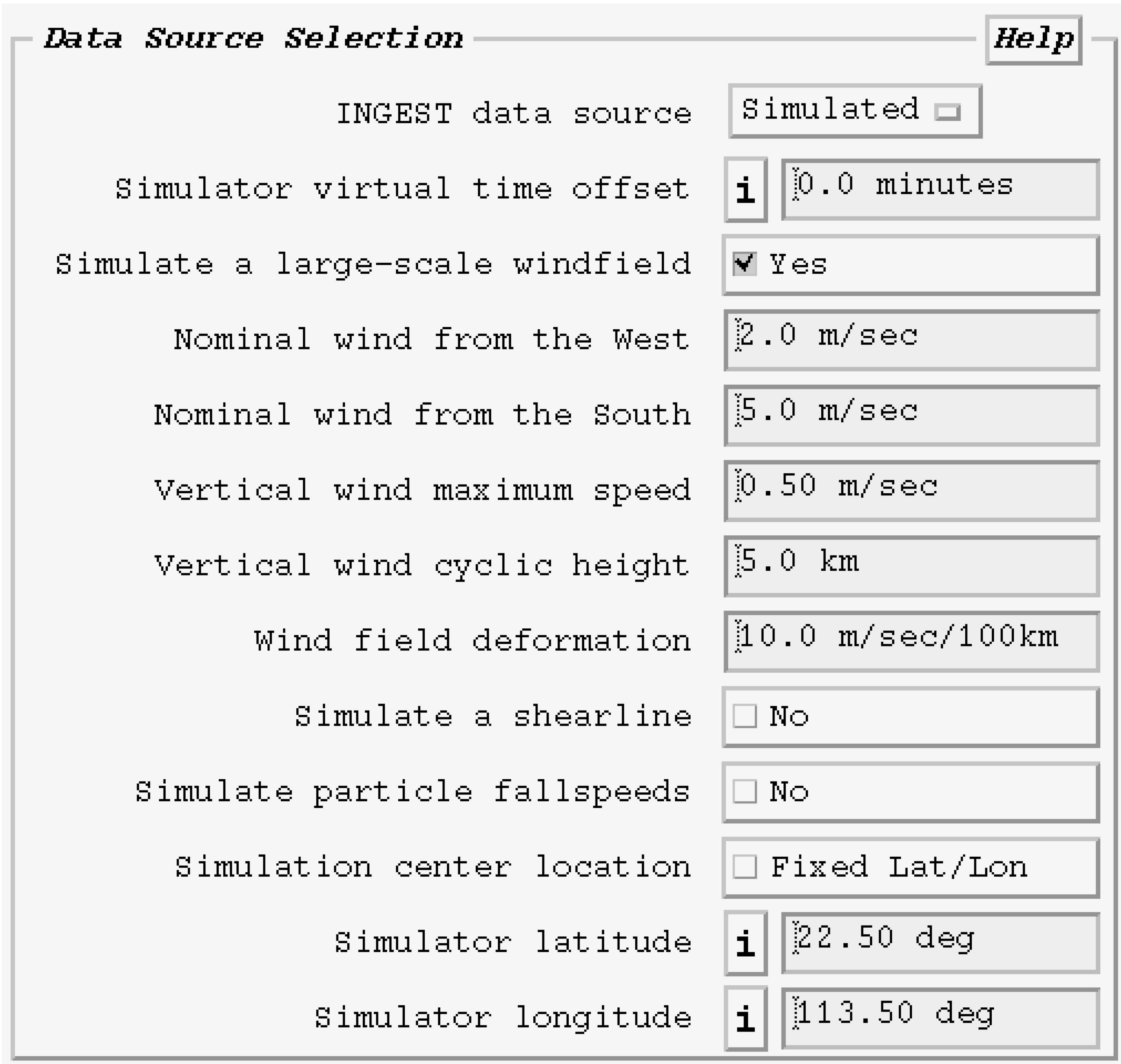
9.7 IRIS Ingest Setups

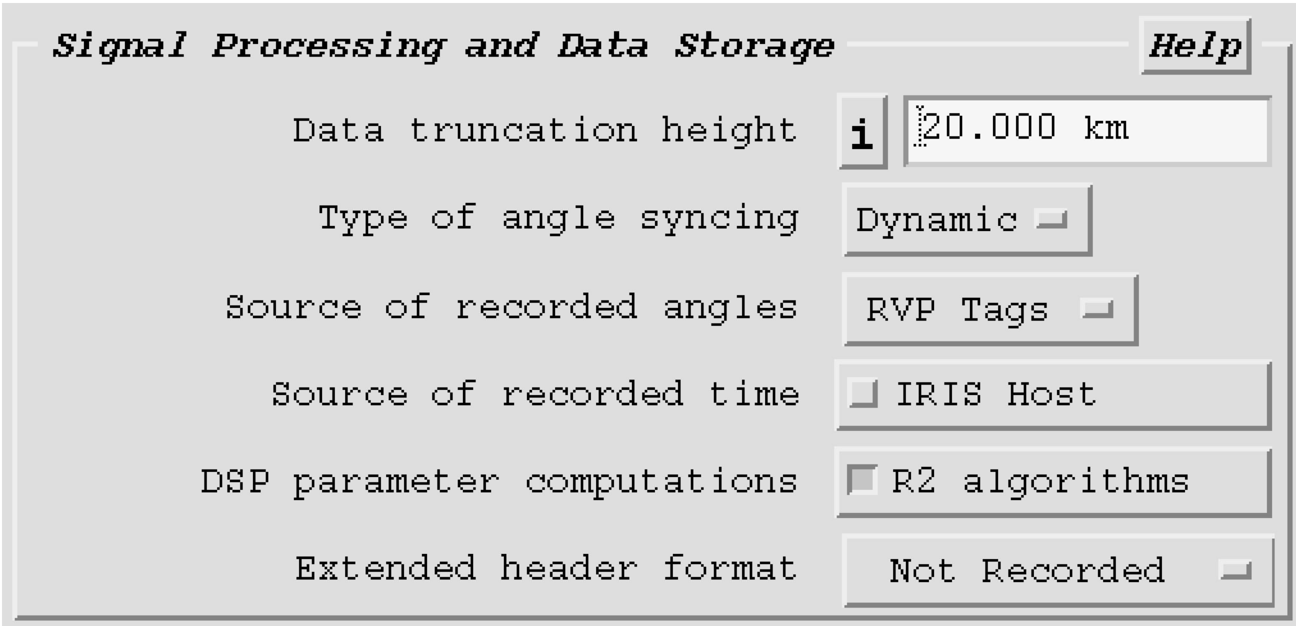
9.7.1 Data Source Selection



- *INGEST data source* — Select either “From DSP” or “Simulated” for the data source. For normal radar operation select “From DSP”, and the remainder of the section is blanked.

IRIS supports simulation of a data field of winds and storm cells which move about the radar. For testing compositing, the location and time offsets of the simulated data is configured here.

9.7.2 Signal Processing and Data Storage



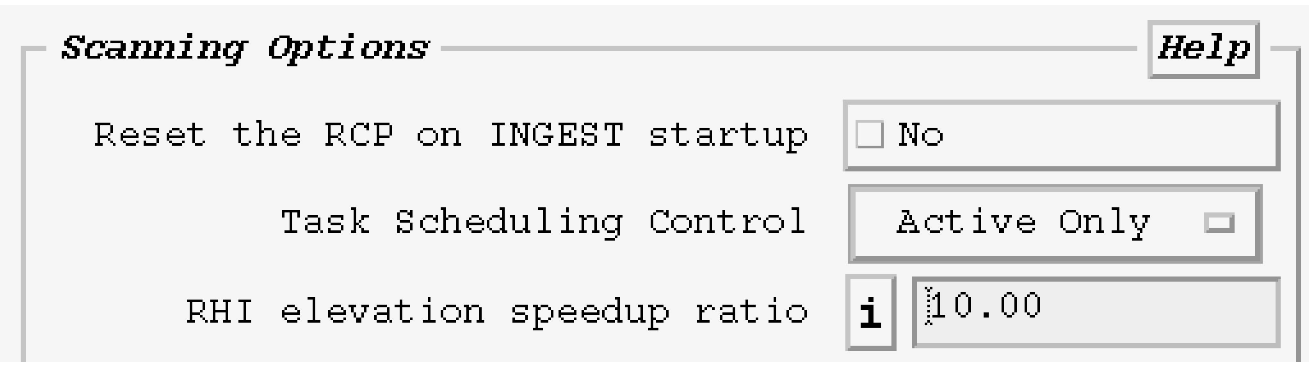
- *Data truncation height* — Any data calculated to be above this height are removed to save disk space. This is typically set to 20km. This is height above the radar dish. This truncation is not applied to manual scans.
- *Type of angle syncing* — Select the method of angle syncing as “Static,” “None,” or “Dynamic.” Also set the RVP6 Setup “Angle Sync” question question to “user” for this setup selection to take effect. The RVP7 & 8 will use dynamic if turned on.
- *Source of recorded angles* — Enter one of the following values:
  - RVP Tags — Angle information supplied by the RVP.
  - IRIS Host — Angles are taken directly from the antenna interface software. This choice is used for simulations where the signal processor does not have angle information. It is not recommended for operational systems.
- *Source of recorded time* — Enter one of the following values:
  - RVP Tags — Time for each CPI is logged on the RVP8. This feature is only available on RVP8 systems. Active Ingest task scheduling is still based on the IRIS host computer, so such systems should be time synched.
  - IRIS Host — Time for each CPI is taken directly from the IRIS host computer. Because of buffering data will arrive and be time tagged in groups of 2 or 3 CPIs.
- *DSP parameter computations* — Choose either “R2 algorithms” or “R1 algorithms.” Use the R2 processing algorithms to estimate SNR and spectral

width. Also set the RVP6/7 TTY Setup “R2 processing” question to “user” for this Setup selection to take effect.

- *Extended header format* — Enter one of the following values:
  - o *Not recorded* — Doesn’t record extended ray headers.
  - o *V0* — Records time and calculations
  - o *V1* — Records time and navigation.

  SIGMET recommends not recording extended ray headers if they are not required.

9.7.3 Scanning Options

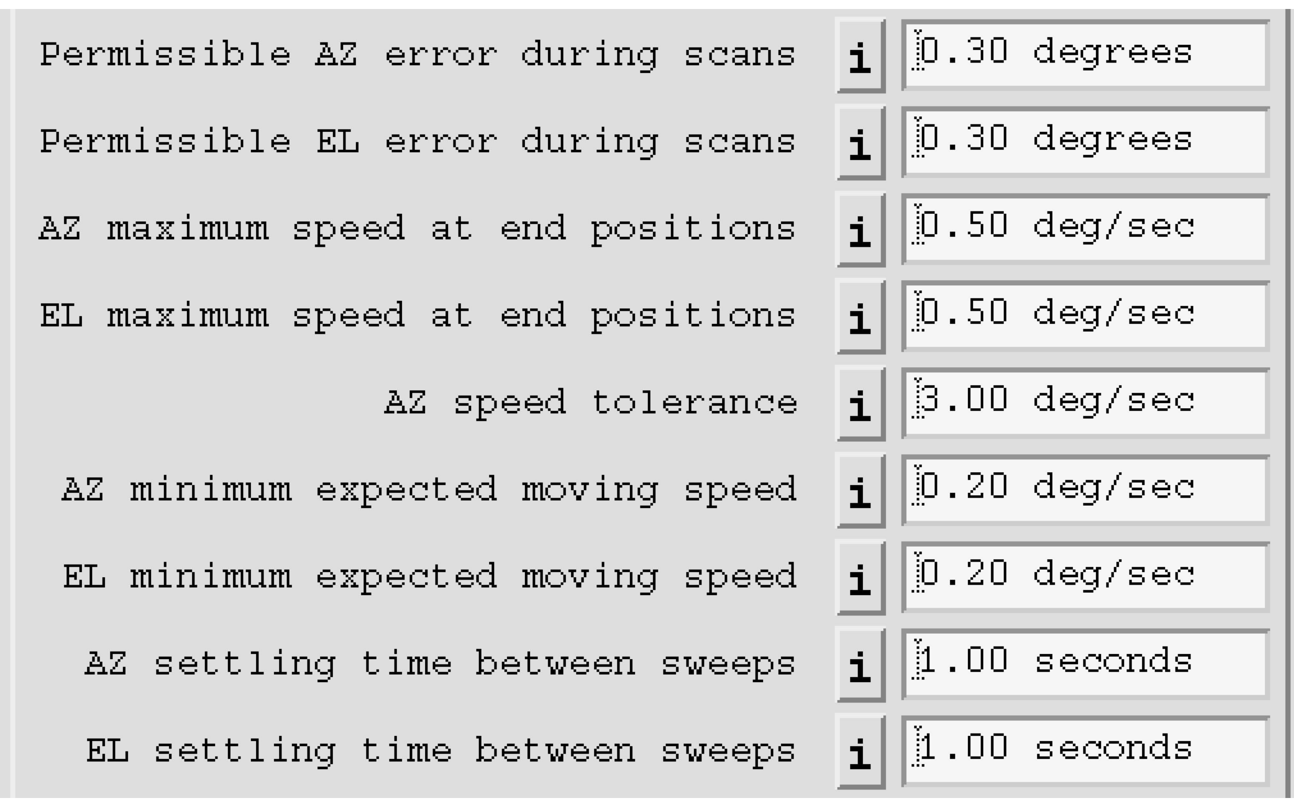


- *Reset the RCP on Ingest Startup* — Causes an *Error Reset* command to be sent to the RCP whenever the INGEST process is started. The reasons that you might want to do this are:
  - o In dual/redundant systems, the reset will clear any error conditions that may have accumulated while the RCP was inactive. These generally will not be “real” faults, and it is safe to clear them automatically.
  - o In single radar systems. the reset helps to insure that the RCP will actually be ready to respond to ingest’s commands.
  - o With the reset enabled, you can then clear RCP shutdown conditions easily from the IRIS Radar Status menu by toggling the INGEST process Off/On.

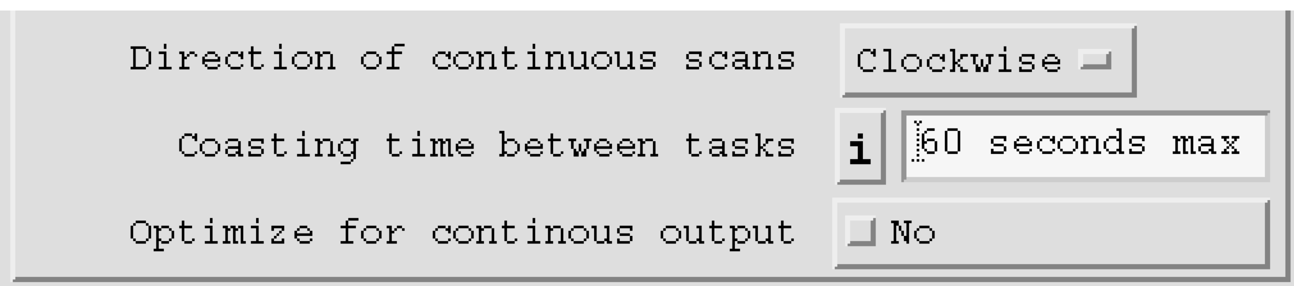
  The main reason *not* to select the automatic reset is that you may prefer a policy in which RCP shutdowns are always manually handled by an operator, after first determining that the original cause of the failure has been repaired.
- *Task Scheduling Control* — Normally set this to “Active Only”. IRIS supports a “Passive” mode of data collection in which it is slave to other radar control software. In this mode, IRIS monitors the azimuth, elevation, and PRF of the radar and attempts to match it with the tasks in the task schedule, and to record data. This requires the RVP7 or RVP8 signal processor. See Appendix C of the *IRIS Radar Manual* for details of using passive mode.
- If Passive Only or Active/Passive is selected then the “Passive Type” is specified. The choices are:

- o Multi–Tasking — This intended is for PPI Full scanning when the system controlling the antenna does one or more volume scans. In this case there can be more that one TASK in the TASK Schedule.
- o Single Tasking — This can be used for any scan mode (Sector, RHI, PPI Full, Manual). In this case there may only be one TASK in the TASK Schedule.
- o Status Slaving — This can be used for any scan mode (Sector, RHI, PPI Full, Manual) and there can be multiple TASK's in the Schedule. The controlling computer must send a STATUS product to IRIS to signal which TASK is about to start. In this case, there is an additional question to provide the "Slaved to Site Code" (three letter site code of the site sending the STATUS products.
- o TS Playback — This can be used for any scan mode (Sector, RHI, PPI Full, Manual) and there can be multiple TASK's in the Schedule. Use with tsarchive to play back recorded data. Will select the task based on the name recorded with the data.

- *RHI elevation speedup ratio* — During RHI scans, the antenna velocity is increased at higher elevations in order to save time. This parameter controls how much faster the antenna goes at 90 degrees elevation compared to 0 degrees. This is typically set to 10.



- *Permissible AZ/EL error during scans* — The IRIS system insists that the antenna get to within this angular distance of any desired position before proceeding. The tolerances are in degrees, and are typically set to about 0.5 degrees.
- *AZ/EL maximum speed at end positions* — These speed limits work in conjunction with the above position limits. When the antenna is positioned within the angle tolerance, it must also be moving at a speed less that these maximums. This prevents falsely proceeding in the case of an underdamped antenna which moves quickly through its settling position several times before coming to a stop. The speed limits also help to remove the initial elevation "starting trail" during continuous PPI scans. SIGMET recommends the setting of 0.5 degrees/sec.
- *AZ speed tolerance* — At the start of each sweep, IRIS waits until the antenna speed is within the value of the requested speed. This prevents the sweep from starting while the antenna may be still moving to fast.
- *AZ/EL Min expected moving speed* — When IRIS is positioning the antenna using the above angle and speed criteria, it is possible that success is never attained. This can happen if the antenna gets stuck before reaching the destination, or if it oscillates endlessly around that point. During any repositioning operation, IRIS first calculates a maximum time to wait based on the angular distance to be traveled and the minimum moving speed given here. Five seconds are added to compensate for edge effects. IRIS proceeds after this time limit expires, regardless of what the antenna is doing. This prevents endless waits resulting from antenna defects. Typical values are 1.0 to 5.0 degrees/second. A value of 0 result in a fixed 5-second maximum wait.
- *AZ/EL min settling time between sweeps* — These minimum times allow IRIS to work better when the step between tilts is very small. In addition to the above criteria for determining that the antenna is close to a desired position, IRIS will wait these minimum times.



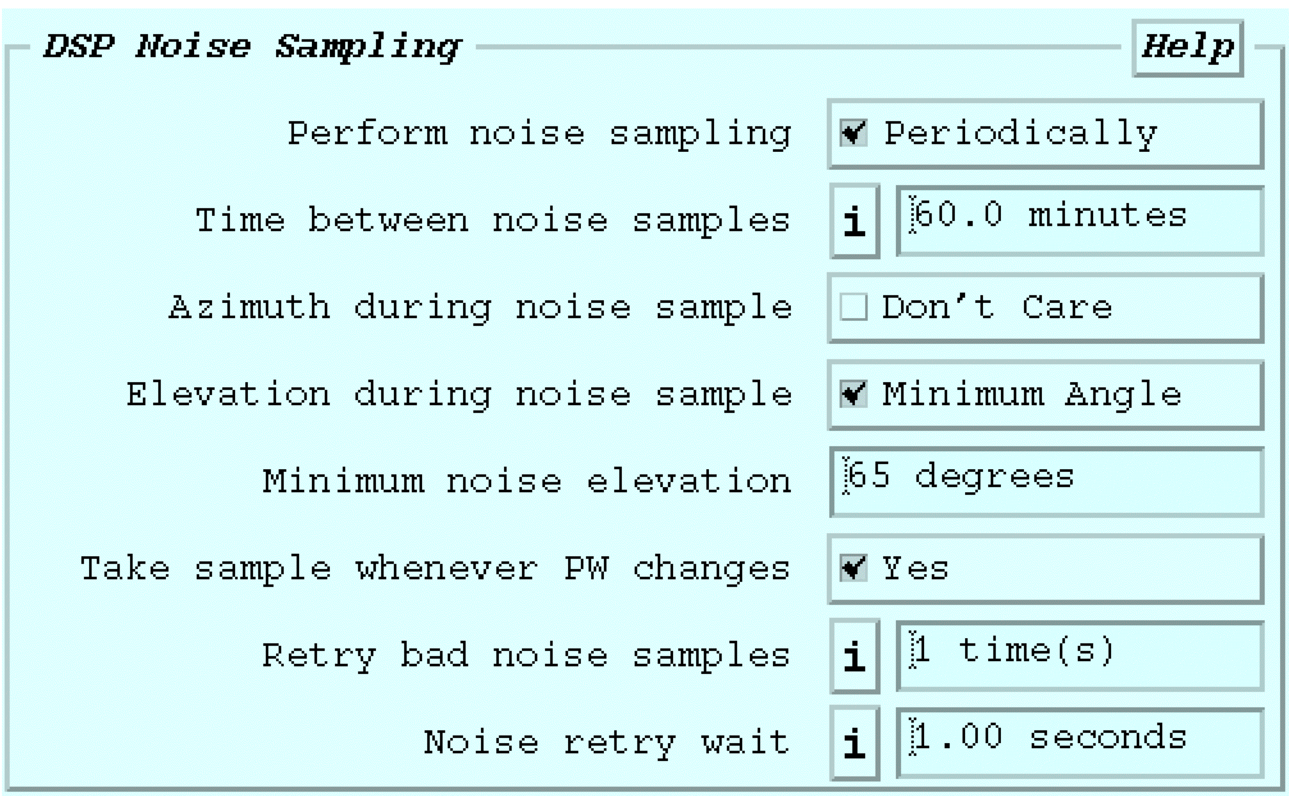
- *Direction of continuous scans* — You can specify whether continuous PPI scans go "clockwise" or "counterclockwise." To equalize the wear on the gears, SIGMET recommends that you change this every few months.
- *Coasting time between tasks* — If the number of seconds between two continuous scan PPI tasks is less than this number, IRIS will not stop the antenna between the

tasks. This can prevent wear on the antenna. Set this value to 0 if you want to always stop between tasks.

- *Optimize for continuous output* — If set to “Yes”, it will make the following changes from the legacy behavior:
  - o Leave the DSP in continuous output mode between tasks.
  - o If the same task is running continuously, skip reading the gparm data at the start of the task. This means it would not detect faults like burst pulse missing.
  - o Do not set the sweep number value between sweeps.

  Please leave it to “No” unless you want continuous real-time displays. For continuous displays, please also disable the noise sample in ingest. When set to “Yes”, you should see only about 1 ray missing between tasks at 3 rpm 1 degree resolution. Consider using instead the real-time data sent directly from the RVP8. This feature is only recommended for the RVP8.

9.7.4 DSP Noise Sampling



- *Perform noise sampling* — Use this flag to disable automatic noise sampling done by IRIS. This is appropriate for passive ingest, and for use with a fixed noise level in the RVP7 or RVP8. It can save scan time, and avoid contaminated samples. Modern IF receivers do not have a noise level drifting problem. When disabled, noise samples are taken from the values stored inside the PVP, be sure to type in and save the powerup noise levels for each pulse width. Operational noise levels are not taken from the value found on the last zauto calibration. The effect of not taking noise samples is different on different processors:

- RVP6 — Feature not supported, do not use.
- RVP7 — Current noise level is used. After reset this is the powerup value.
- RVP8 — Current noise level is automatically set to the powerup value.

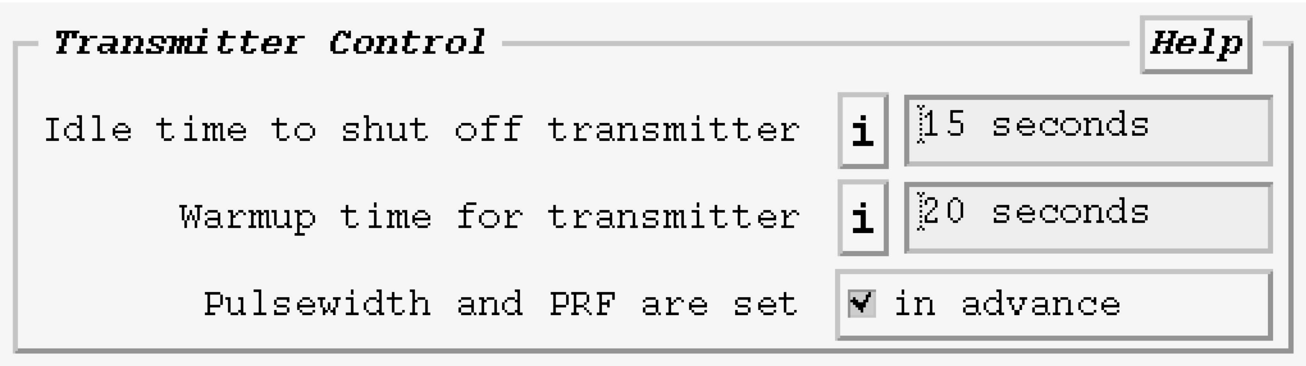
- Time between noise samples — When a task starts, if it has been at least this long since the last noise sample, a new sample is taken. This is typically set to 10 minutes.
- *Azimuth during noise sample* — Select either “Don’t care” or “Specific Angle.” If you select “Specific Angle,” an entry box appears wherein you can specify the azimuth in degrees at which to take the noise sample.
- *Elevation during noise sample* — Select either “Don’t care” or “Minimum Angle.” If you select “Minimum Angle,” an entry box appears wherein you can specify the elevation in degrees at which to take the noise sample.
- *Take sample whenever PW changes* — If the signal processor cannot store separate noise levels for each pulse width, then you must answer this “Yes”.
- *Retry bad noise samples & Noise retry wait* — These questions are used to configure the noise sample interference detection. Ingest is attempting to detect the case in which during the noise sample you get interference from another pulsed radar. This interference will cause a higher noise sample, and cause uncalibrated data, similar to hitting the sun at noise sample time. This feature is only available on the RVP6, not on the RVP7 or RVP8.

  Each time Ingest detects interference it will signal the message “Interference in noise calculations”. Ingest will then wait the retry wait time (typically 1 second), then try it again. This is repeated up to the specified number of times. The assumption is that the other radar is a scanning radar, so if you wait 1 second, it should no longer be pointed at you. After the last attempt, if it still detects interference, it will run the scan anyhow. Therefore if you are getting false positives, you still get the correct data.

  The RVP6 noise sample includes both the log average of the signal, and the log of the linear average of the signal. For normal Raleigh noise, these differ by a consistent amount. However, if there are a series of impulses added to the signal, the linear average goes up a lot more than the log average. If it goes up to more than the *Noise Interference Threshold* (typically 1.2) it is flagged as interference. To allow tuning of the threshold, the two noise levels are printed in the signal. These are in unit of 0 to 1, where 1 is the full range of the log A/D convertor. If your calibration slope is set wrong, then the formula will be uncalibrated.

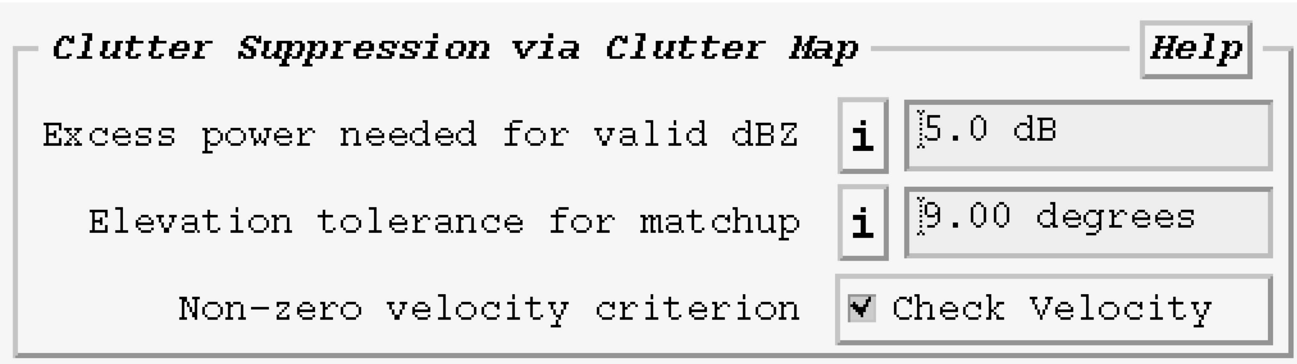
The RVP7&8 has an interference filter for the normal data processing, but not the noise sample. However you can also disable the periodic noise sample for the RVP7&8.

9.7.5 Transmitter Control



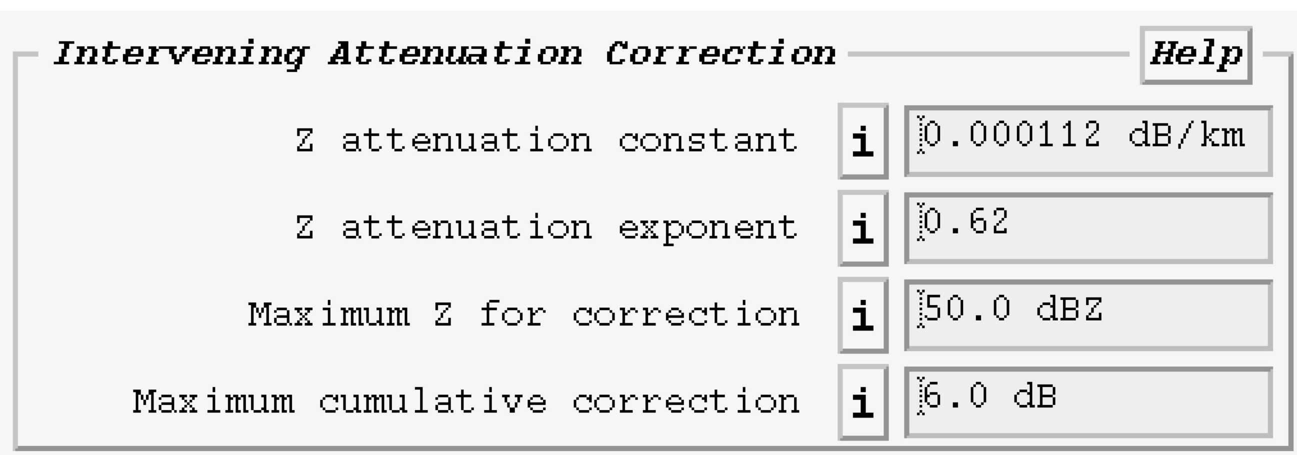
- *Idle time to shut off transmitter* — If no task is scheduled to run for this number of seconds, then the transmitter is switched to standby to extend its lifetime (only in radiate automatic mode).
- *Warm-up time for transmitter* — Each time an IRIS task starts, we wait this long since the radiate was turned on. This allows time for a slow on circuit, and also time for the RVP to detect the burst pulse power. Note that on many systems pulse with and polarization changes will require radiate to be turned off. In such cases this warmup time is triggered. If radiate is set to automatic and the transmitter is off, it is turned on this many seconds before the task starts. Be sure to set this less than the idle time above.
- *Pulsewidth and PRF are set* — In addition to warming up the transmitter in advance as specified above, ingest can also set the pulsewidth and PRF. This allows the transients to settle if there is time between scans.

9.7.6 Clutter Suppression



- *Excess power needed for valid dBZ* — This section is used to configure IRIS's ingest clutter map. If the Task Configuration Menu's clutter map button is pressed then IRIS looks for a ingest file marked as the residual clutter map. All range bins containing data in the clutter map file are thresholded unless the current data is at least this much higher. If we exceed the threshold, the dBZ value is passed unchanged.
- *Elevation tolerance for matchup* — When looking for the corresponding range bin in the clutter map file, the nearest elevation angle is used up to this maximum difference. If none found, then no correction is applied.
- *Non-zero velocity criterion* — If this is set to "Check Velocity" then data which would pass the excess power test will be thresholded if the velocity is near zero.

9.7.7 Intervening Attenuation

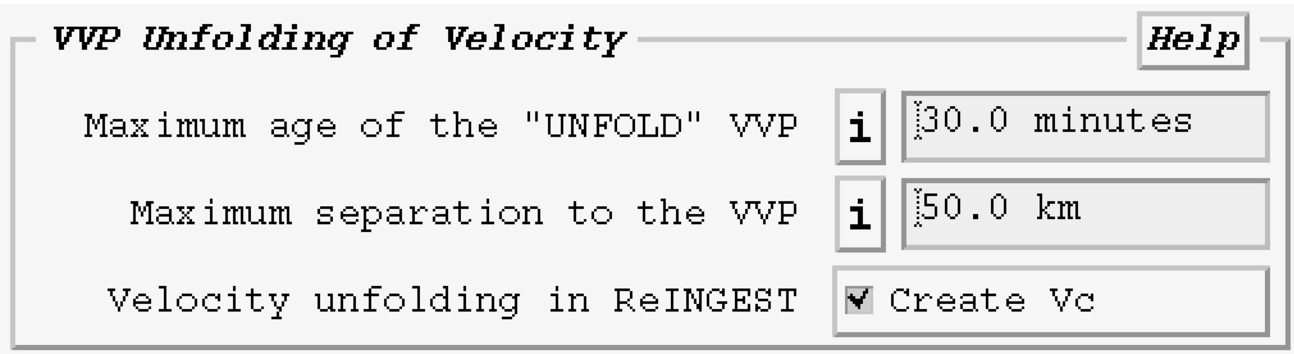


This section allows configuration of the coefficients used for the intervening attenuation correction. When enabled, the corrected reflectivity Zc is computed from Z using the following equation:

$$dBZ_c = dBZ + 2C\Delta r \sum Z^E$$

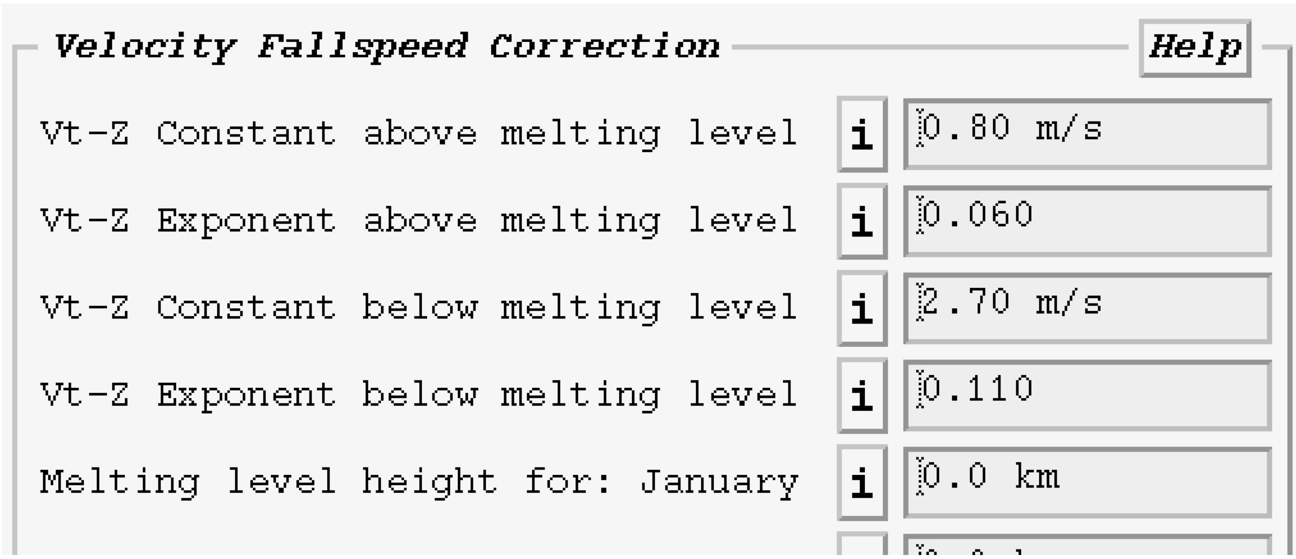
Where C is the constant above, and E is the exponent. All values of Z are clipped at the maximum Z before the calculation, and the total correction is clipped at the maximum cumulative value. We have default values for C and X band radars. We recommend no correction be used for an S-band radar.

9.7.8 Unfolding of Velocity

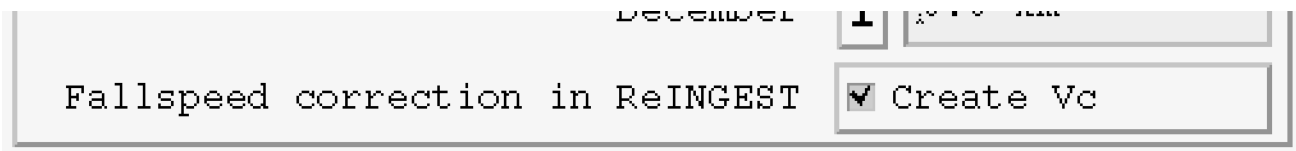


- *Maximum age of the “UNFOLD” VVP* — IRIS can be configured to automatically unfold velocity data, producing a data type called Vc based on a VVP product on the disk which must be called “UNFOLD”. This is the maximum time difference between the data and the time of the UNFOLD product. See the NDOP product configuration section in the *IRIS Product and Display Manual* for details.
- *Maximum separation to the VVP* — This is the maximum distance between the radar location of the VVP product and the data being unfolded. It might be necessary to unfold based on a different radar when one radar’s data is imported.
- *Velocity unfolding in ReINGEST* — If enabled, then Vc using unfolding will be computed at reingest time, overriding any previous values. The recommended setting is “Disabled”, if unfolding is required specify it in the task configuration.

9.7.9 Velocity Fallspeed Correction



- *Vt–Z Constant above melting layer* — See the NDOP product configuration section in the *IRIS Product and Display Manual* for a detailed discussion of the fallspeed correction.. These questions allow you to specify Vt–Z relationship both above and below the melting layer. “Vt” is the terminal velocity of the precipitation. We use a exponential equation like: $Vt = Constant\ Z^{Exponent}$
- *Melting level height for: January* — Enter an estimate for the melting level for each month. These are heights above mean sea level. Note that these values can be changed dynamically while IRIS is running.



- *Fallspeed correction in ReINGEST* — If enabled, then Vc using fallspeed correction will be computed at reingest time, overriding any previous values. The recommended setting is “Disabled”, if fallspeed correction is required specify it in the task configuration. Note that if either *Fallspeed correction in ReINGEST* or *Velocity unfolding in ReINGEST* are enabled then Vc is make at reingest time.