EMC JEDI QC Code Sprint Objectives

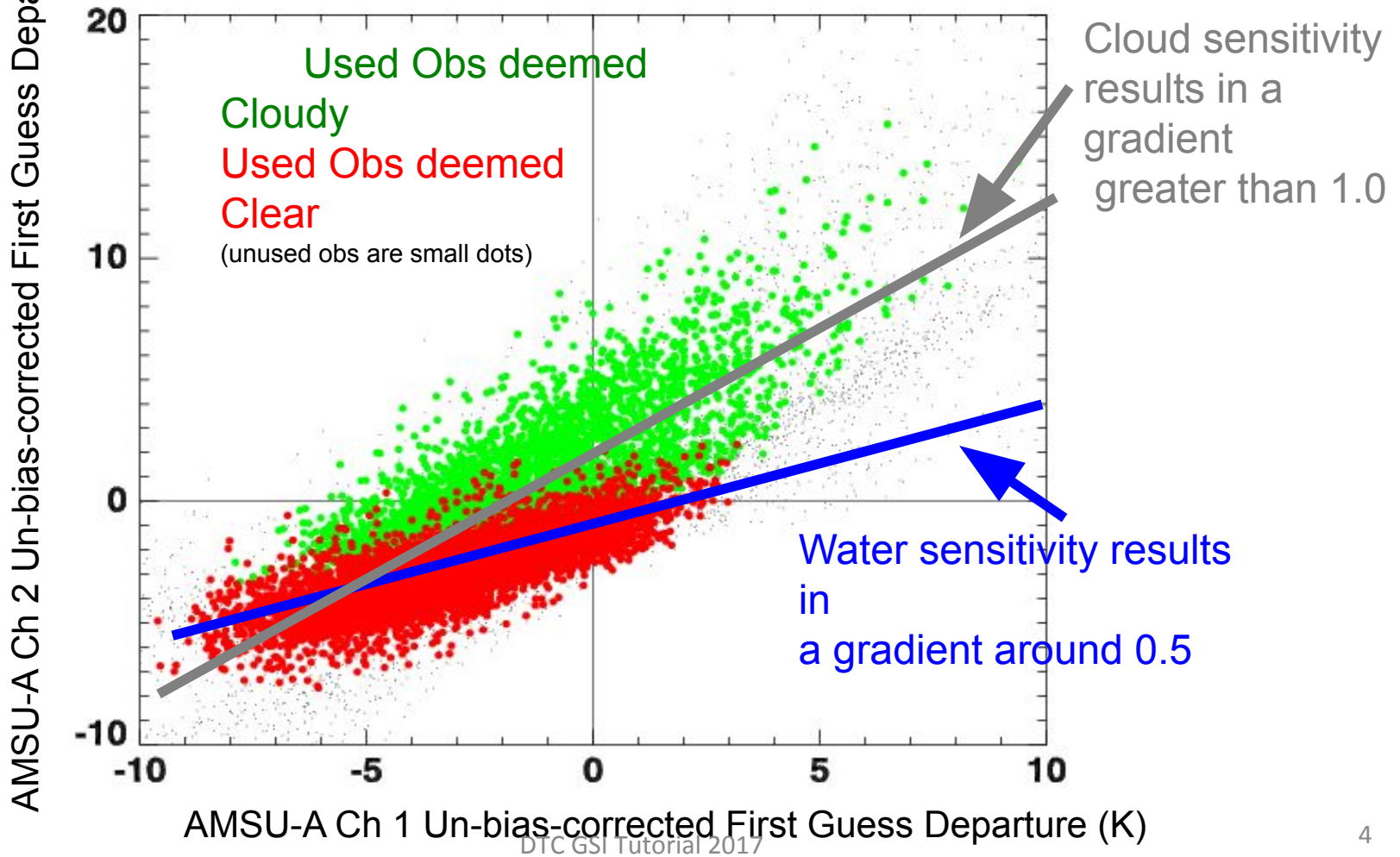
- Quality control is assumed to mean
  - removing observations that fail QC
  - modifying observation errors in cases where QC indicates additional uncertainty
  - removing observations from the set used to constrain the bias correction

EMC JEDI QC Code Sprint Objectives

- The ultimate aim is to replicate all QC decisions used in GSI in JEDI
  - this will be via a small number of generic tests which are configured via YAML files
- Cloud detection is a priority
  - infrared cloud detection requires additional fields from the CRTM/RTTOV (overcast radiances)
- A summary of QC decisions in the GSI for AMSU mapped onto generic tests is here.

Backup

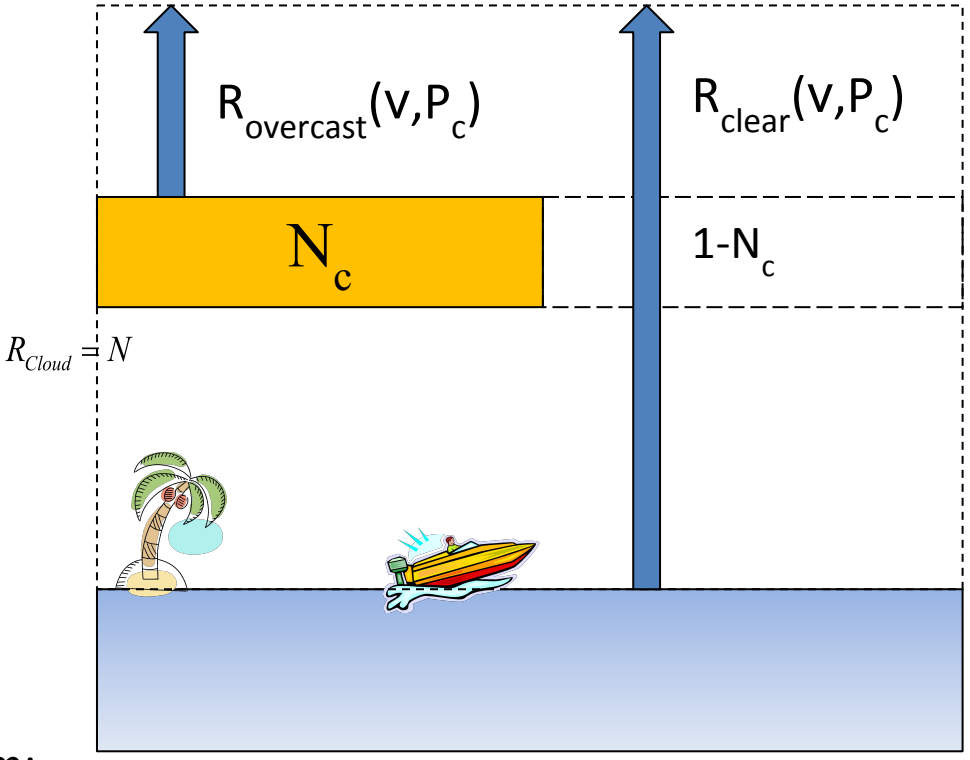
Cloud detection in the microwave



GSI Cloud Detection

(based on Eyre and Menzel, 1989)

- Assume the cloud is a single layer at pressure P_c and with unit emissivity and coverage within the FOV, N_c.
- $0 \leq N_c \leq 1$
- P_c is below the tropopause and above the ground
- Find P_c and N_c so that the RMS deviation, $J(N_c,P_c)$, of the calculated cloud from the model (over a number of channels) is minimized.
- Remove all channels that would be radiatively affected by this cloud.



Cloudy radiance, R_{cloud}, is calculated from:

$$R_{cloud} = N_c R_{overcast} + (1-N_c) R_{clear} = N_c (R_{overcast} - R_{clear}) + R_{clear}$$

GSI Cloud Detection (contd.)

The height and fraction of the cloud is found by minimizing the cost function:

$$J_C = \sum_i (R_{cloud,i} - R_{observed,i})^2 / \sigma_i^2 =$$
$$\sum_i (N_C [R_{overcast,i} - R_{clear,i})] + (R_{clear,i} - R_{observed,}))^2 / \sigma_i^2$$

i=channel index; σ_i= assigned observation error for channel