Common Artifacts in SPM Images

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Artifacts: Two Main Groups

- **Embedded Artifacts**: present in the image when image is first recorded
- **Added Artifacts**: from image processing
Embedded Artifacts

- Are in the image because something was not working right, or some condition was sub-optimal WHEN THE IMAGE WAS BEING RECORDED
  - Some, but not all, have remedies
Sources of Embedded Artifacts

- Contaminated, damaged, or dull probe tip
- Mobile/Dirty/Loose-material-on Sample
- Sub-optimal feedback setup
- Noise
- Instrument malfunction
- Instrument inherent shortcomings
- Changes in the environment
- ...

...
Contaminated tip
Loose material on sample
Mobile Sample: Drift in Y
Sub-optimal Feedback Setup: Feedback resonance
Sub-optimal Feedback Setup: Partial tracking of surface
Noise
Image-processing-induced Artifacts

- May be introduced into the image when the image is first recorded
- May be added to the image later
- IT IS ALWAYS BEST TO PROCESS A COPY OF THE IMAGE, AND KEEP THE ORIGINAL UNCHANGED.
Image processing-induced artifacts

- Planarizing image
  - whole image at once, versus line by line
Image Processing
Image Processing:
Zoom. Fit a plane. Level line-by-line.
Image Processing: Large slope + Step + Artifact.
Image Processing:
Fit a plane.
Level line-by-line.