Bit Grooming Improves Precision/Storage Ratio

Objective
- Reduce dataset size while preserving numerical precision

Approach
- New lossy compression algorithm
- Alternating bit adjustment
- Uses bitmasks, not FP math
- Preserves requested precision
- No statistical biases
- Relies on lossless DEFLATE
- Preserves full IEEE FP format
- Readable by all existing tools
- Single-line command:
  \texttt{ncks -L1 --ppc default=4}

Impact
- Reduces data storage volume by 60-70%
- Eliminates meaningless “false precision”
- No additional software burden on users


Silver, J. D. and C. S. Zender (2016), Compression-error tradeoff for large gridded datasets, in revision after review, Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-177.