Exercise 5. Diagnostics in Observation Space

Expected for Upcoming Projects: No Due Date

- Read reference on diagnostics in observation space
  → Broader use for diagnostics & sanity check of data assimilation systems

- Build a module to diagnose / plot the relationship between
  \[ d^{ob} = y^o - Hx^b \] and \[ d^{oa} = y^o - Hx^a \]
  for all analysis steps

  - Check \[ |d^{oa}| / |d^{ob}| < 1 \]
  [same as] \[ (d^{oa})^T(d^{oa}) / (d^{ob})^T(d^{ob}) < 1 \]

  - Check \[ \theta^{boa} \] [angle between \( d^{ob} \) and \( d^{oa} \)] \(< \pi/2 \]
  [same as] \[ \cos \theta^{boa} = (d^{oa})^T(d^{ob}) / |d^{oa}| |d^{ob}| > 0 \] or \[ (d^{oa})^T(d^{ob}) > 0 \]

Plot \[ |d^{oa}| / |d^{ob}| \] & \( \cos \theta^{boa} \) vs. time