Things to consider

Precision of input

How accurate are our observations?

Satellites can measure sea surface temperature with an uncertainty of 0.3 ºC and surface wind with an uncertainty of 1 m/s.
- Remote Sensing of European Seas - V.Barale, M.Gad

Precision of algorithm

How do errors grow through different computations?

Known for small algorithmic components but not
in combination.

How big are model uncertainties/inaccuracies?

Stochastic components used to increase spread.

Precision of output

How accurate do we want our answer?

e.g. Temperature in Exeter:
Double precision: 7.8902349472045898°C
Single precision: 7.89023495°C
Half precision: 7.890625°C

What’s been done

Single precision

- Met office - Pressure solve (operational) and large-scale precipitation.
- ECMWF - “full” forward integration model. Now used for testing and future model development.
- MeteoSwiss - most of model running operationally (60% savings over double).

Lower than single

- Reduced GCMs and simplified models at Oxford (go see Sam Hatfield’s poster).
- Nemo ocean model in mixed precision at Barcelona Supercomputing Center.