



The challenges of using netCDF and GRIB for managing forecast data at the Met Office

Bruce Wright

Closing the GRIB-netCDF Gap Workshop, ECMWF – 24 September 2014



Rather-specific user perspective (by proxy) ...

- Background: **Where do we want to be?**
Where are we now?
- Challenges: **What problems have we found?**
Where do we see issues arising?
- Summary



Background

Where do we want to be?

Where are we now?



Future Forecast Processing

'Best Gridded Data' project

Improving the data: **content** = science-focus

Greater use of Ensembles : Statistical Correction : Blending

Improving the delivery: **packaging** = technology-focus

Standard...

Parameters, Grids & Levels : Formats & Software : Metadata

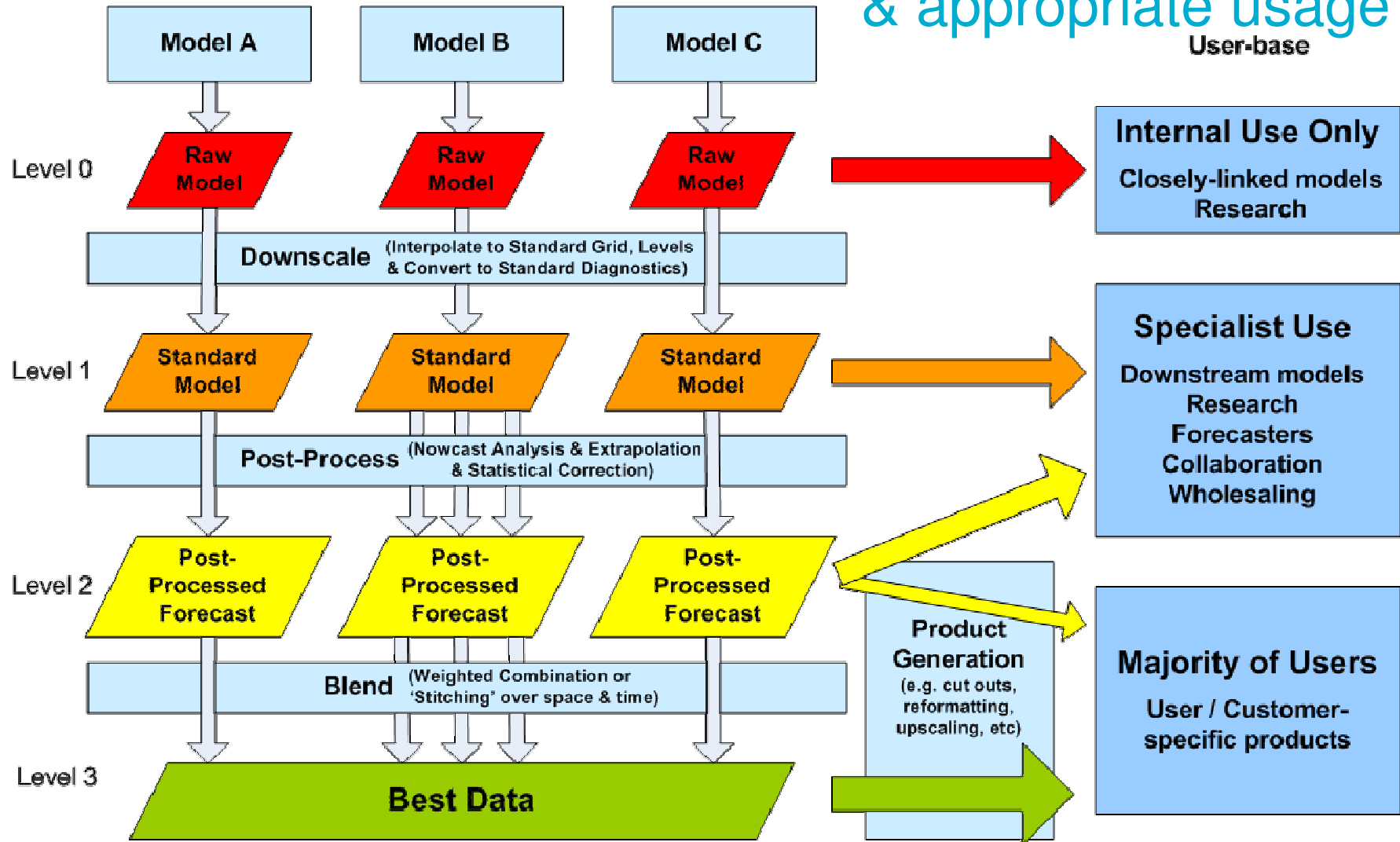
→ Also important to decouple from projected large
NWP model data volumes on new supercomputer



Future Forecast Processing

Defined level of processing applied

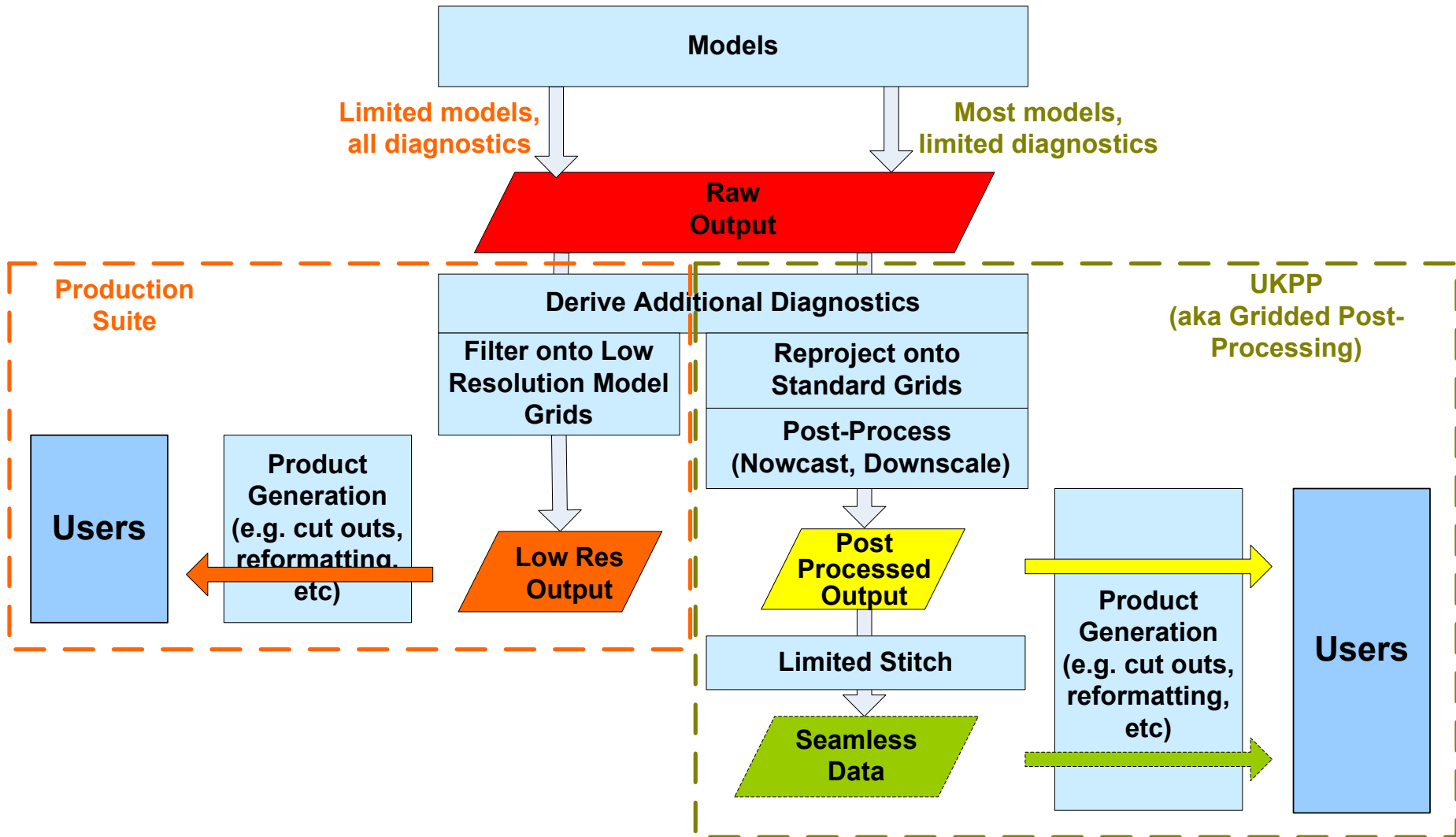
& appropriate usage





Current Forecast Processing

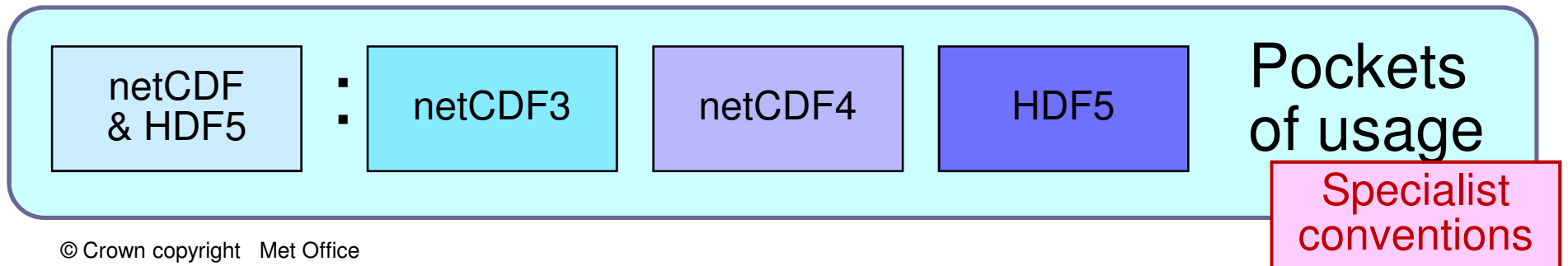
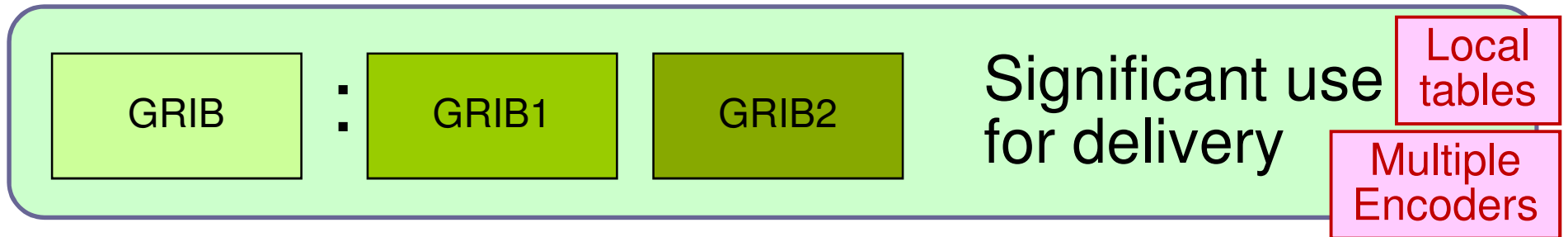
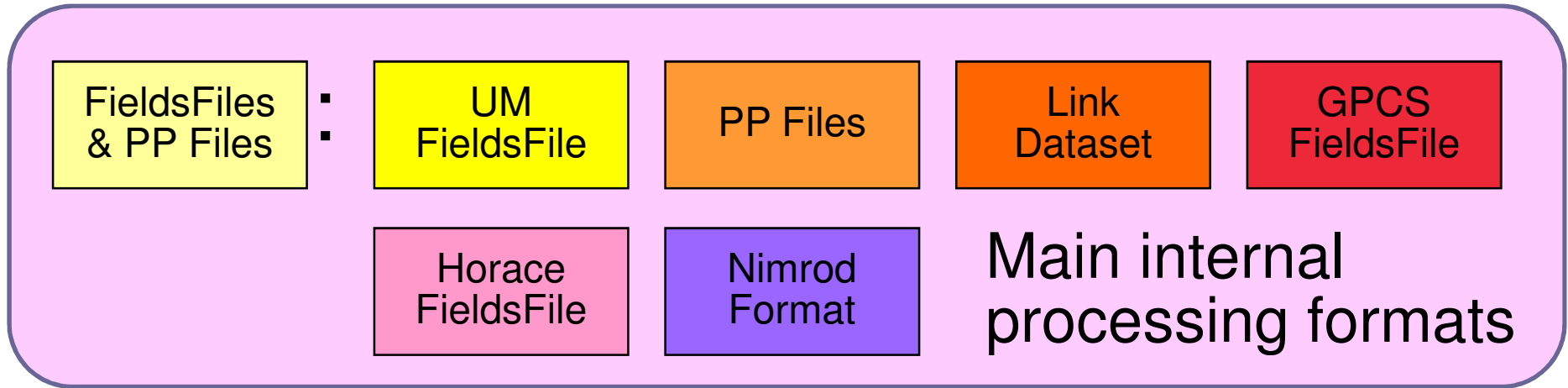
Two main gridded data





Current Forecast Processing

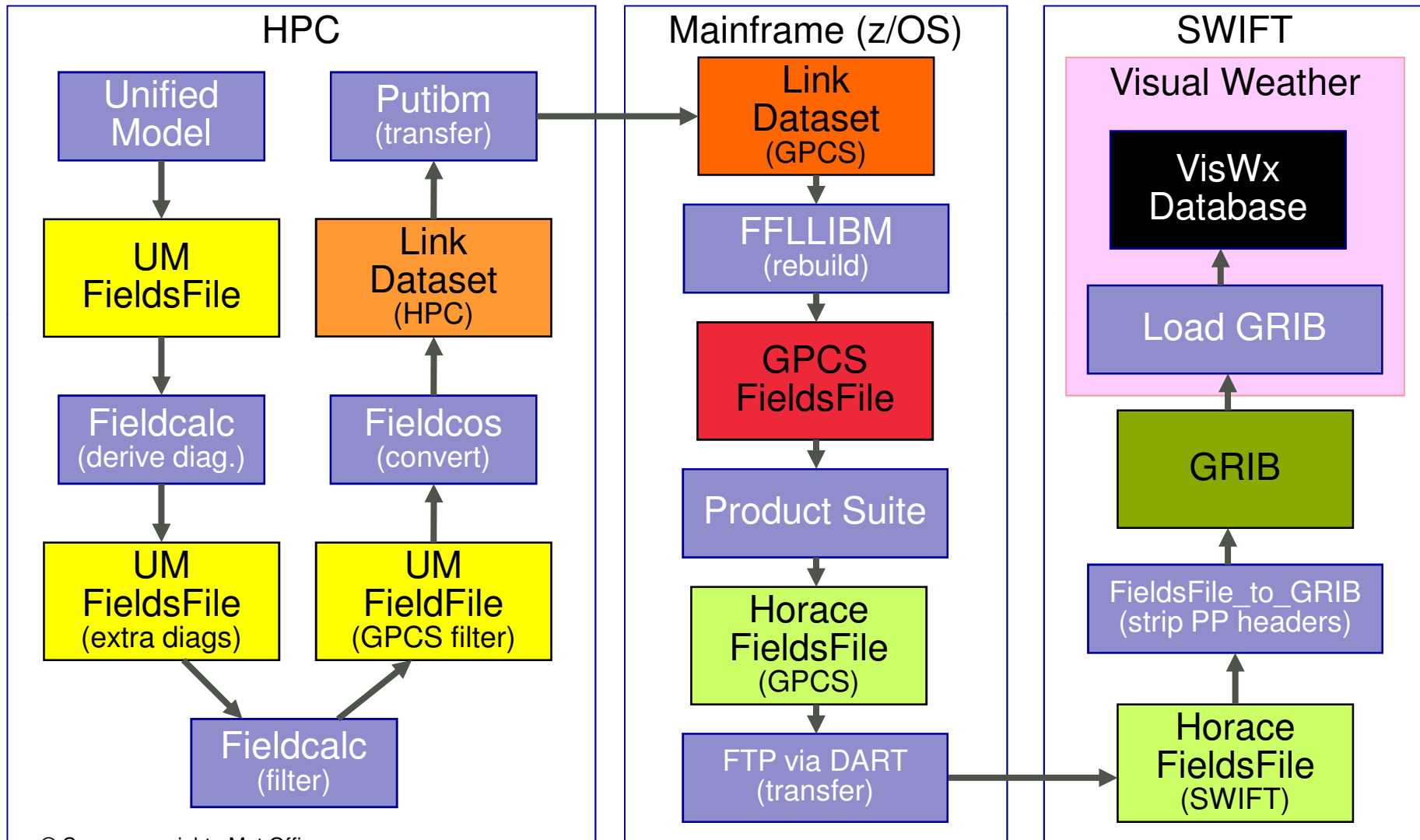
Bespoke & non-standard format usage





Current Forecast Processing

Example of complex processing chain





Challenges

What problems have we found?

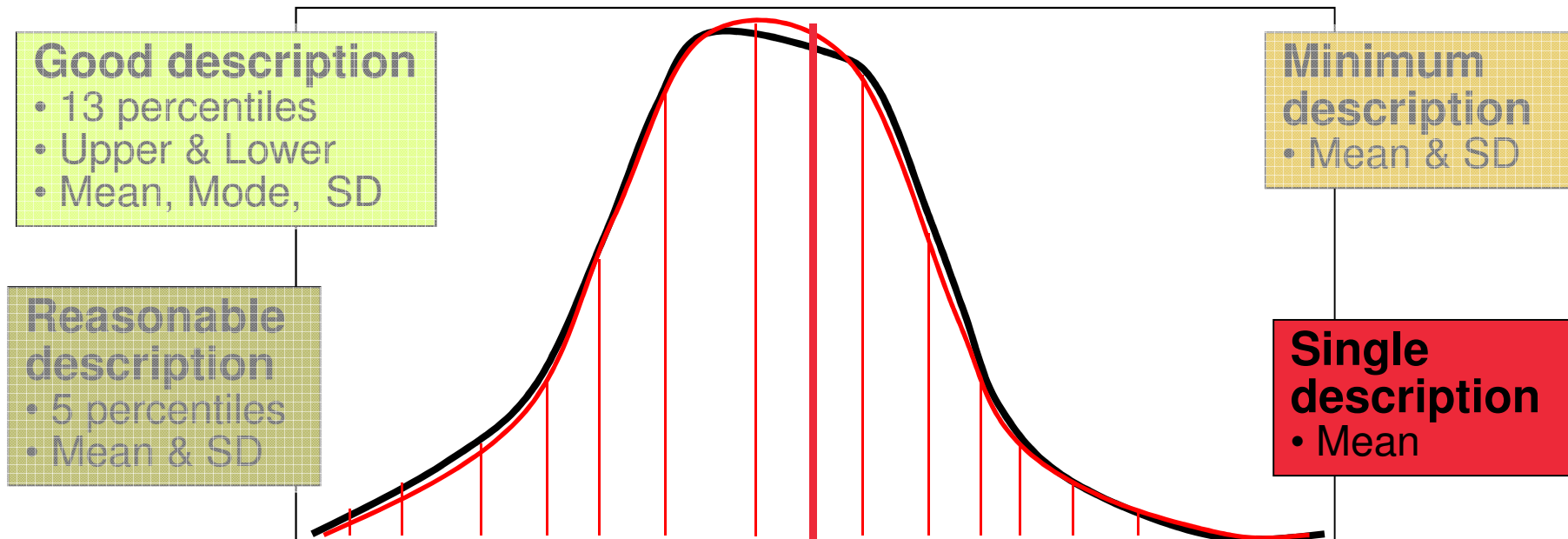
Where do we see issues arising?



Representing PDFs? Ensembles & probabilities

- Paradigm shift to use of uncertainty
- Describe using **Probability Density Function**

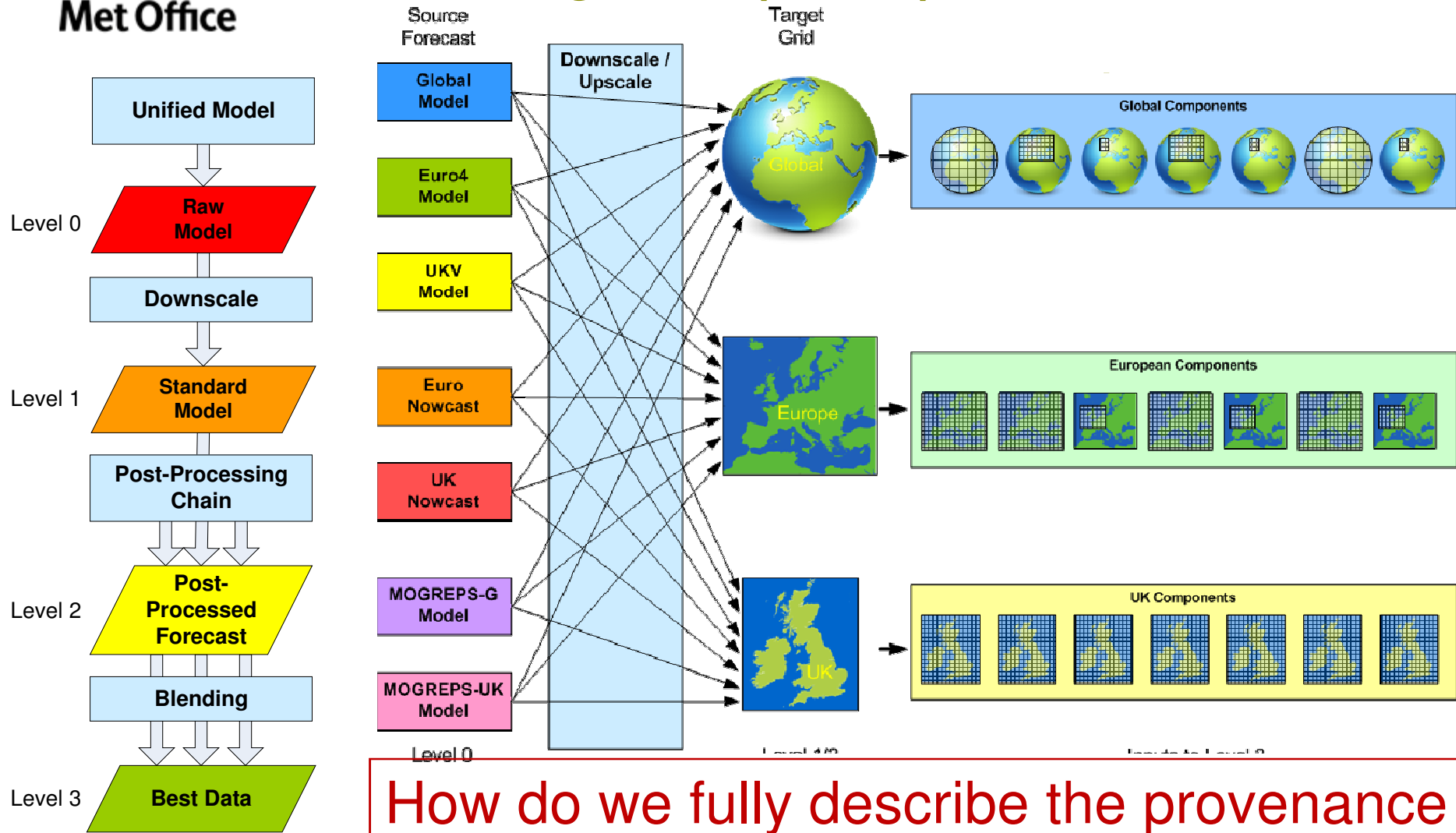
We need one way of representing the PDF that consistently handles these different forms





Complex processing chain

Combining multiple inputs

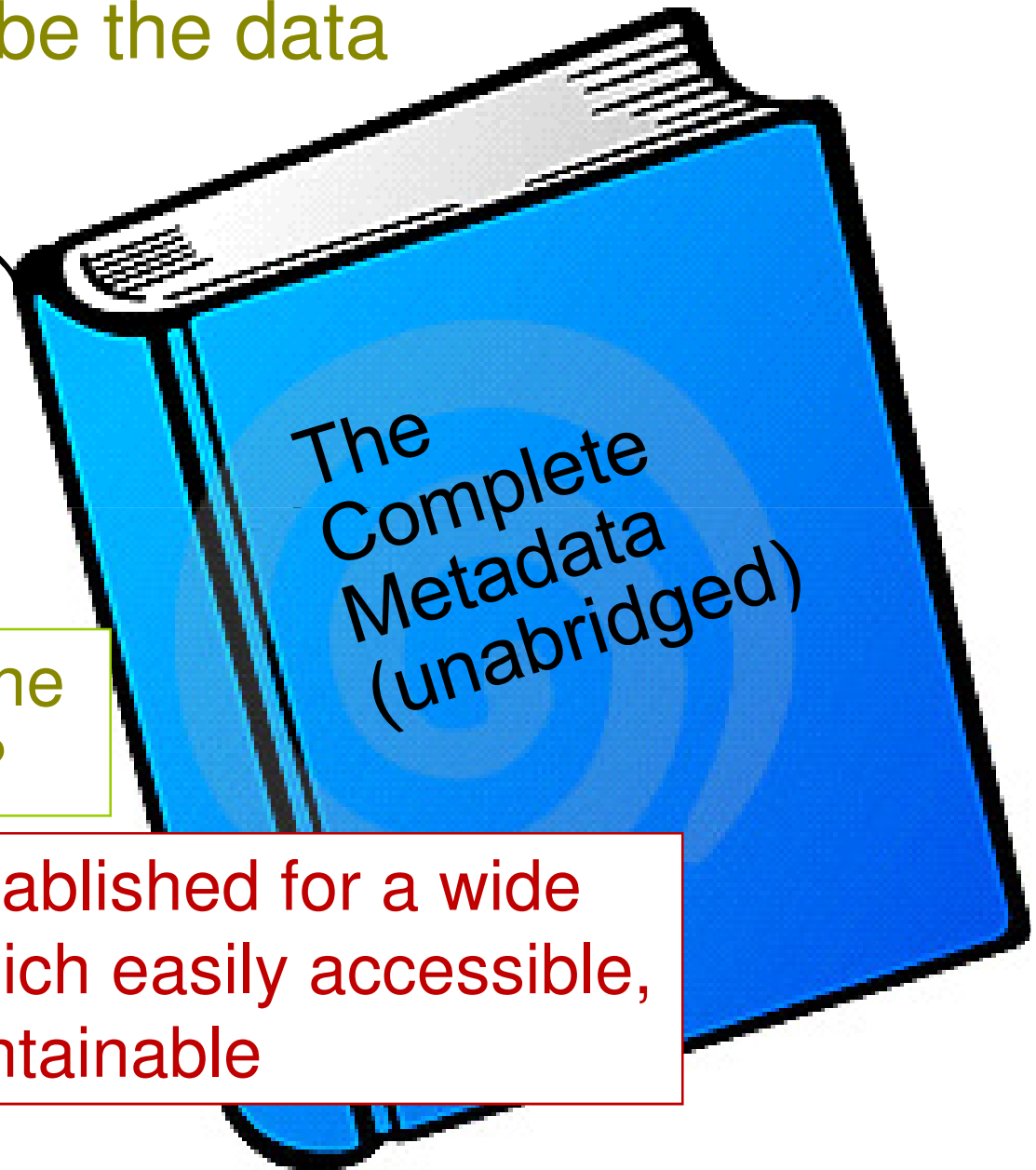
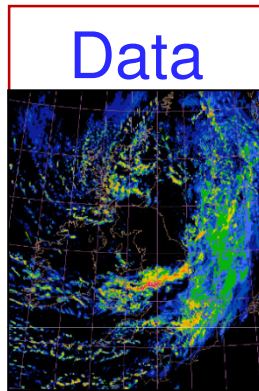


How do we fully describe the provenance in a standard, but usable way?



Comprehensive Metadata

Fully describe the data



How complete should the travelling metadata be?

We need registries established for a wide range of metadata, which easily accessible, usable and easily maintainable



Standard Approaches

Multiple ways of defining the same info

- E.g. in GRIB, Orographic Height: Compounded by use of Local Tables
 - height of ground, or:
 - height of a surface above sea level
- E.g. in netCDF, multiple ways of describing statistics:
 - 'traditional' CF Cell methods
 - newer netCDF-U (based on UncertML)

We need to agree standard approaches for use of metadata standards



Controlled
Vocabularies

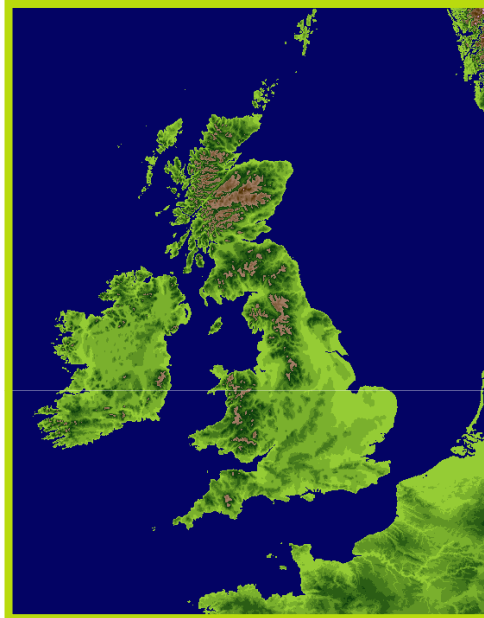


Governance



Extending the Standard

Not all required capability exists



OS National
Grid projection

Had to wait until Transverse Mercator support added to GRIB2 to distribute data on native grid

CF standard names coverage is patchy for many standard 'weather diagnostics'

height_at_cloud_top ✓

height_at_freezing_level ✗

'feels like temperature' ✗

We need to be able extend aspects of the standard easily and fairly quickly



Wider Conformance

Harmonised standards

- Having to conform to other standards:
 - INSPIRE
 - Domain-specifics

How do we combine different metadata standards?



Met Office



Summary

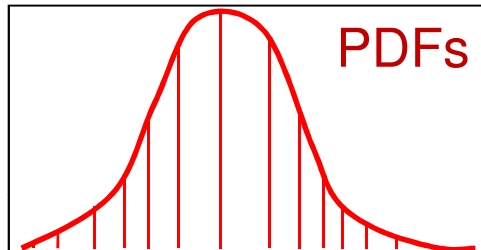


Summary

Some of the challenges

Improving the data: **content** = science-focus

Greater use of Ensembles : Statistical Correction : Blending



Provenance

Improving the delivery: **packaging** = technology-focus

Standard...

Usable & Easily Extensible

Parameters, Grids & Levels : Formats & Software : Metadata

Standard Approaches

Governance

Registries & Controlled Vocab

Multiple Conventions



Any questions?

