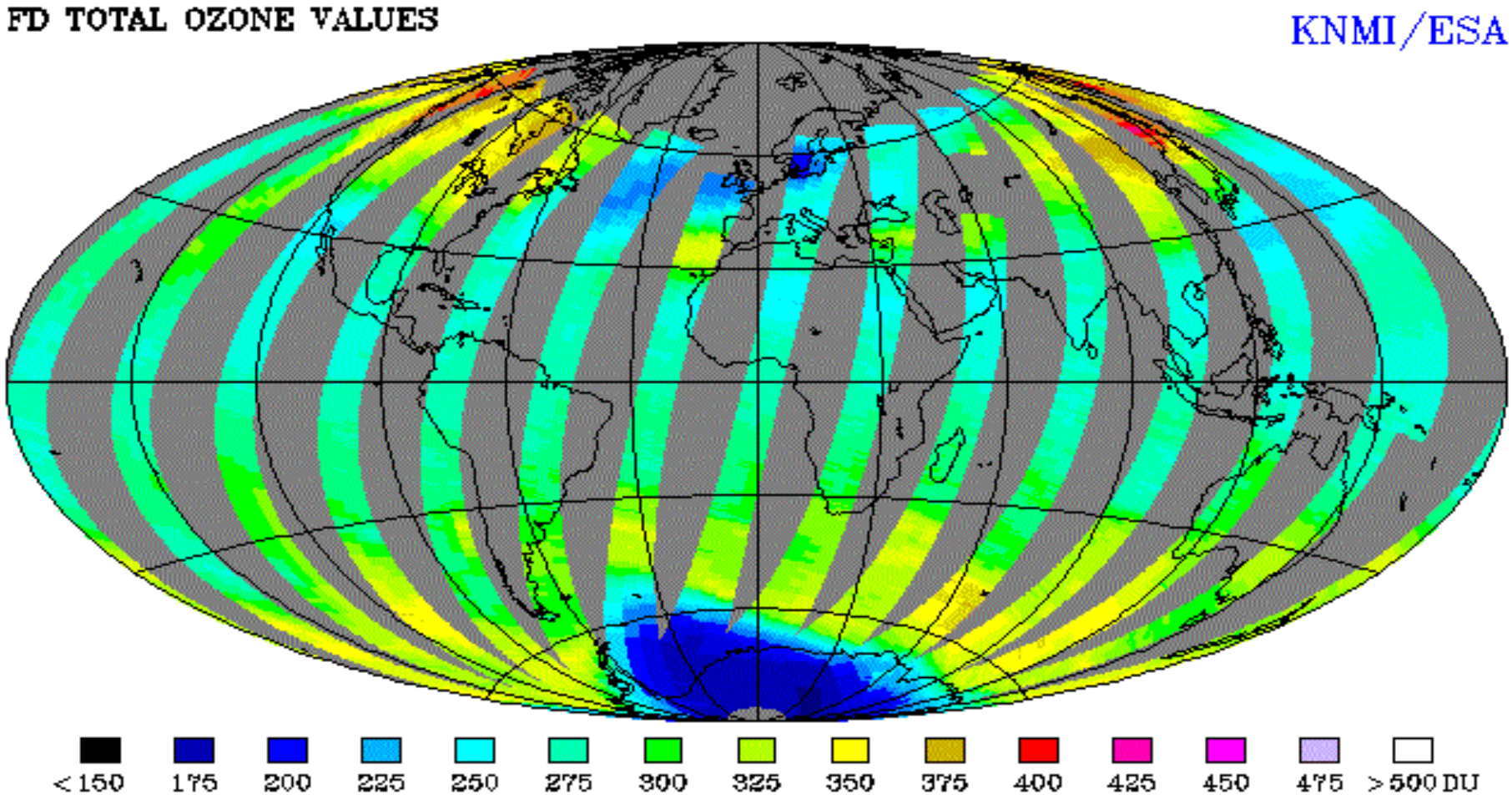
Summary item 3

- ESA and WP9 part 1 (45m)
  - DataGrid Frascati infrastructure (AT, 7.5m)
  - ESA GOME application: Neural Network Ozone Profile Retrieval From GOME Observations (NOPREGO) – (SC, 7.5 m)
  - ESA experience in using DataGrid testbed 0 and testbed 1 (JL, 15m)

Institutions involved in neural processing

- ESA/ESRIN - Infrastructures, GOME data
- University of Tor Vergata (Rome, Italy) - Ozone profile and cloud fraction
- KF University (Graz, Austria) - Total ozone, total water vapour and cloud top height

GOME Instrument (1 day coverage)



Computation of Ozone Profiles (1)

- GOME Input data (level 1)
  - Generated at DLR, archived at ESA
- Unit data chunk: complete orbit or part of it
- GOME output products (level 2)
  - Reference Products generated at DLR, at KNMI, …
- GOME level 2 processing schema in WP9
  - KNMI (OPERA) – 1day data requires 20 days processing
  - ESRIN (NOPREGO) - Neural Network approach for fast delivery experiment

Computation of Ozone Profiles (2)

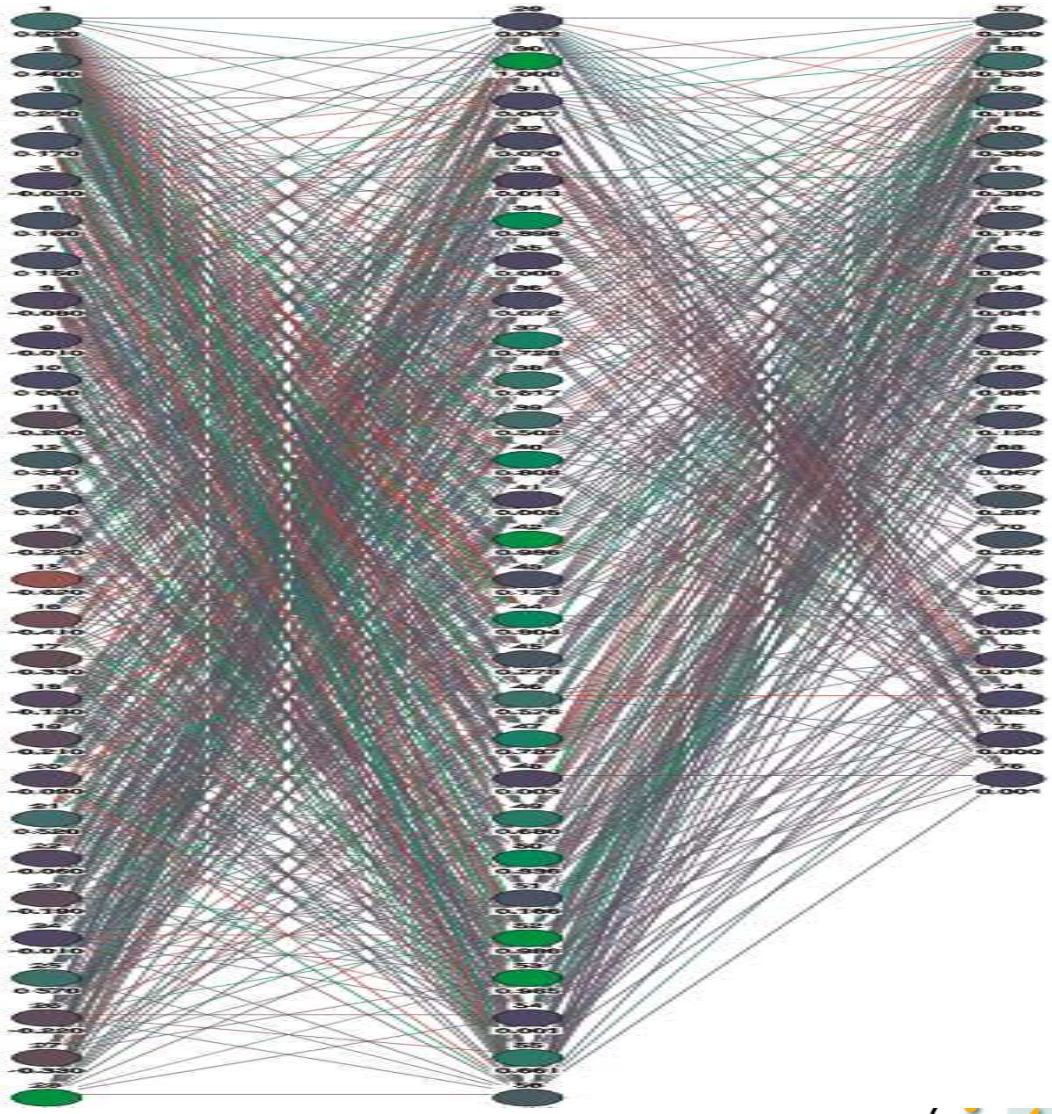
- Neural Network approach for level 2 products
  - GOME Input data (level 1)
  - Information used in neural network experiment
    - Solar and Earth shine spectral radiances
    - Geometric info (solar zenith angle, line of sight)
    - No radiance calibration required
  - Overall # of inputs: 28
- Unit data chunk: complete orbit or part of it

The neural processing approach

28 input neurons

28 hidden neurons

20 output neurons



The output products

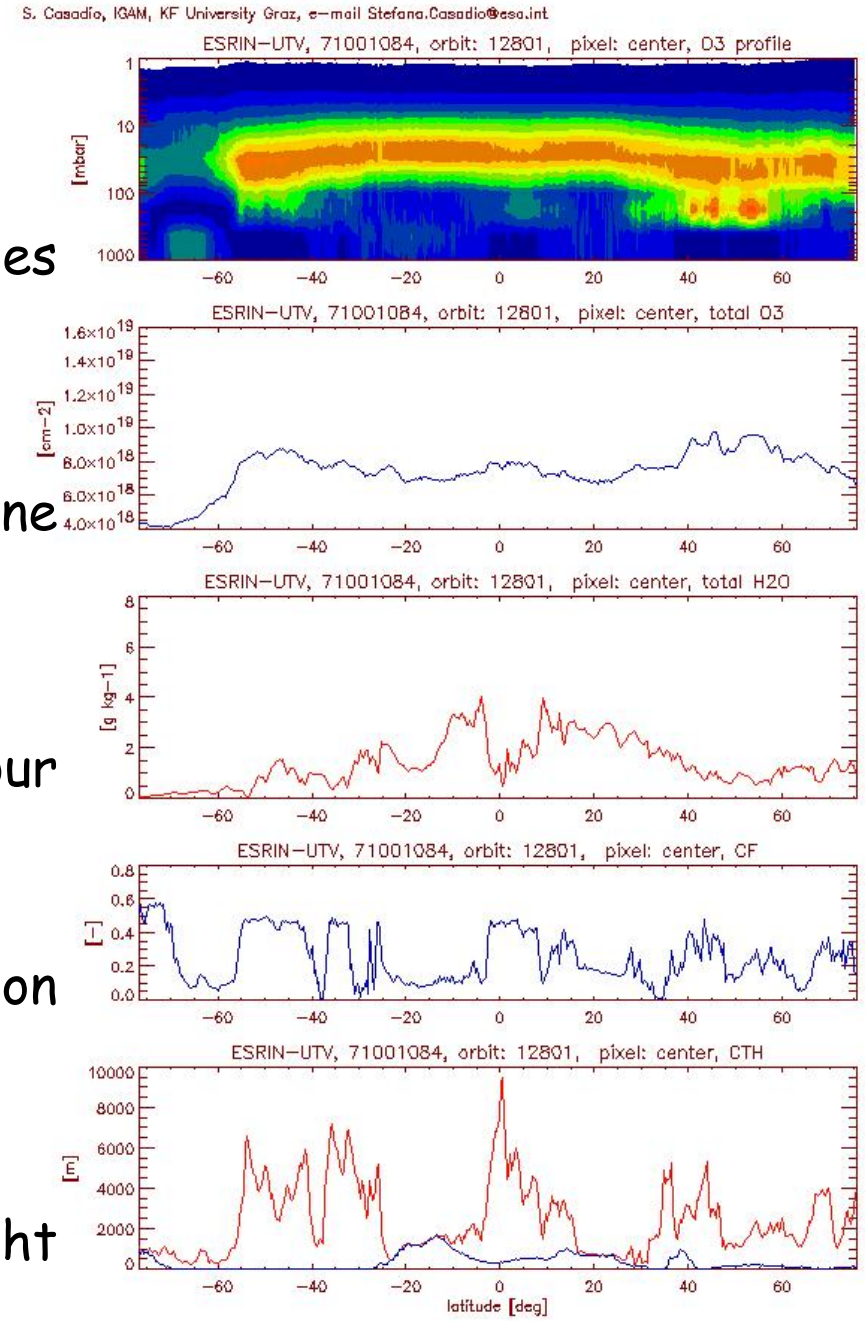
Ozone profiles

Total Ozone

Total Water Vapour

Cloud Fraction

Cloud Top Height



Why DataGrid?

- Data volumes:
  - No measurements: 28000 retrievals/day (14+ orbits)
  - Total level 1 data input: 200 MB/Day ➔ 80 GB/Year
  - Total level 2 products output: 15 MB/Day
- Reference processing: computation intensive
- Neural Net Processing Time: 4.5 min/day
  - Alternative science approach (e.g. parametric optimisation)
  - Real time applications possible
- DataGrid demonstration
  - **Collaborative validation (e-science) of alternative processing methods against ground lidar measurements**
  - **Future: interactive profile generation over user selected area through web-portal**