

# Concept description of the output coupling

*Author 01/2024: N. Dreier, DKRZ*

The “output coupling” is a generic interface for output components using the coupler YAC. It allows users to develop its own tailored output components independent of ICON. If the output coupling is enabled in the namelist (`&coupling_mode_nml%coupled_to_output = .TRUE.`) ICON calls all `yac_fdef_field` for all proper (see below) variables in the ICON varlists and stores the `field_id` in a `field_list`. Furthermore some metadata (currently only the CF metadata) is attached to the field. 3D variables are also exposed with a collection size corresponding to the vertical axis. After the definition phase of YAC (after `yac_fenddef`) all fields are removed from the list that are not coupled. In the timeloop then for all remaining fields `yac_fput` with the corresponding data memory pointer is called. The output coupling is available in the atmosphere and ocean components.

Variables are filtered based on the following criteria:

- The flag `info%loutput` must be set.
- Variables that are infact a container of tracers are not exposed.
- The horizontal grid must either be `GRID_UNSTRUCTURED_CELL` or `GRID_UNSTRUCTURED_VERT`
- The first dimension of the variable must be `nproma`.
- For 2d variables: The 2<sup>nd</sup> dimension must be `nblks`
- For 3d variables: The 3<sup>rd</sup> dimension must be `nblks`

**Caveat:** By this approach it is currently not ensured that the variables contain proper values. Some diagnostics are only computed for the namelist output and hence are not updated if no namelist output is attached to the variable. Hence this variable would deliver invalid values over this interface. A workaround is to configure a dummy namelist output that does output in an timespan outside of the runtime of the simulation.

## References

- The YAC documentation: <https://dkrz-sw.gitlab-pages.dkrz.de/yac/>