

Examples of research project work that could be undertaken by CEMAC

Depending on the nature of work to be undertaken, tasks may be more suitable for either scientific domain experts or for technical/programming staff.

Requirements should be discussed with CEMAC to determine the most suitable and available person for the work.

- Provision of bespoke tools for model 'benchmarking' – standardized evaluation code and datasets which can be applied easily to evaluate new model versions / updates.
- Provision of bespoke visualization tools for analysis and debugging
- Provision of bespoke data processing / analysis tools
- Implementation of new model processes / major model development.
- Production of data formats compliant with specifications in assessment exercises (e.g. CMOR, CF-compliance).
- Technical support for rigorous comparison of model output with satellite products (application of averaging kernels to model output, etc).
- Code optimization for different compilers / platforms. Parallelization of code.
- Scientific support and training for application of modeling tools to specific scientific challenges.
- Coordination and production of contributions to MIPs.
- Manipulation of large datasets to create derived products (e.g. satellite data re-gridding, time averaging, etc.)
- Bias correction of climate model data.
- Inclusion of new diagnostics and ancillaries
- Reconfiguration or reprocessing of datasets to allow use in research
- Post-processing tools for data conversion such as PP to NetCDF etc.
- Set-up, coordination and data archiving for large, complex model simulations
- Creating complex plots and visualisations
- Creating animations, "fly-throughs"
- 3D viewing – e.g. OmniGlobe

Ongoing work that CEMAC should undertake, but is not tied to specific projects

These are things that are difficult for us to fund from grant proposals, but are critical to maintaining our position at the forefront of science. Some of these tasks may have overlap with services that already are or could be provided by Faculty / University IT support, while some are specific to domain expert skills in each science area.

- Coordination of large dataset retrieval and storage (e.g. ERA data, MERRA, CMIP output, satellite products).

- Maintenance of model versioning and documentation.
- Production and maintenance of analysis / visualization tools for models and data products.
- Production and updating of benchmarking tools.
- Keeping software libraries and compilers up to date.
- Manage storage of and access to data on local and national machines (PETAL, JASMIN system, local disk storage).
- Installation and testing (benchmarking) of new model versions.
- Porting to new platforms.
- Production of open day demos / teaching resources – harvest interesting runs / benchmark runs.
- Simple modeling tools for teaching.
- Production of materials and tools for teaching of coding / data visualization.
- Interfaces for model data or observational data analysis/display suitable for teaching and outreach activities.

Chargeable services that CEMAC can undertake to support groups

These are things that are difficult for us to fund from grant proposals, but are critical to improving the efficiency of our day-to-day science. Many of these tasks also have overlap with services that may be provided by Faculty / University IT support.

- Bulk file conversion and data processing
- Website production for displaying results / data streams
- Training in use of models or bespoke analysis software.
- Monitoring infrastructure – automated (CPU, disk, memory, user disk space)
- Data processing pipes, augmenting original data