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1 Supplement

Algorithmic Diffentiation using ISSM is only supported for a certain subset of compilers. The port has been achieved on Linux platforms using the GCC suite of compilers. Here, we present the specific set of instructions regarding installation of ISSM with ADOL-C support. They build on the instructions for installation of the regular ISSM package, which can be found at http://issm.jpl.nasa.gov/download/unix.

The main difference when dealing with compiling ISSM with ADOL-C support turned on lies in the additional installation of the ADOL-C and AdjoinableMPI layers.

- The AdjoinableMPI layer can be installed using the standard install.sh script found in the externalpackages directory of the ISSM trunk. The Mercurial repository for AdjoinableMPI is http://mercurial.mcs.anl.gov//ad/AdjoinableMPI.

- The ADOL-C package can be installed using the specific install-withampi.sh script found in the externalpackages directory of the ISSM trunk. The git repository for ADOL-C is https://gitlab.com/adol-c/adol-c.git. The install-withampi.sh script makes sure that the ADOL-C installation enables ampi (–enable-ampi) and that it include the AdjoinableMPI bindings (–with-ampi option).

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Once both packages are compiled, ISSM needs to be re-compiled with a configuration that uses GCC compilers, and that includes the following:

```
--with-adolc-dir=$ISSM_DIR/externalpackages/adolc/install \
--with-ampi-dir=$ISSM_DIR/externalpackages/adjoinablempi/install
```

Once ISSM is recompiled, one can test the AD runs using the ISSM nightly run suite found in the test/NightlyRuns sub-directory of the ISSM trunk. All tests numbered 3000 and more are AD related tests, and have been used for validation of the ISSM AD capabilities. They provide a good starting point for users to build on.