MICM chemistry solvers

Advance the chemical concentrations from TimeStart to TimeEnd, based on the ODE derived from the chemical reactions in the mechanism.

User may choose between either of two solver schemes

- chemistry_driver_ros Rosenbrock (Similar to what is used in some WRF configurations)
- chemistry_driver_moz Mozart (Similar to what is used in CESM with an error control on timestep)

The inputs/outputs are identical for both of them, however runtime options will allow choices of tolerance and configurations of those solvers.

Source code locations

- *MICM_chemistry/src/chemistry_driver_ros.F90*
- *MICM_chemistry/src/chemistry_driver_moz.F90*

Metadata for chemistry_driver routines

chemistry_driver_xxx_init routine (will show mozart, but Rosenbrock values are identical)

```
!> \section arg_table_chemistry_driver_moz_init Argument Table

!! | local_name | standard_name                                    | long_name                                |
units   | rank | type            | kind      | intent | optional |

!! |------------|--------------------------------------------------|------------------------------------------
|---------|------|-----------------|-----------|--------|----------|

!! | TimeStart  | chem_step_start_time                             | Chem step start time                     |
s       |    0 | real            | kind_phys | in     | F        |

!! | TimeEnd    | chem_step_end_time                               | Chem step end time                       |
s       |    0 | real            | kind_phys | in     | F        |

!! | dt         | time_step_for_physics                            | time_step_for_physics                    |
s       |    0 | real            | kind_phys | in     | F        |

!! | errmsg     | ccpp_error_message                               | CCPP error message                       |
none    |    0 | character       | len=512   | out    | F        |

!! | errflg     | ccpp_error_flag                                  | CCPP error flag                          |
flag    |    0 | integer         |           | out    | F        |

!!
```

chemistry_driver_xxx_run routine (will show mozart, but Rosenbrock values are identical)

```
!> \section arg_table_chemistry_driver_moz_run Argument Table

!! | local_name | standard_name                                    | long_name                                |
units   | rank | type         | kind      | intent | optional |

!! |------------|--------------------------------------------------|------------------------------------------
|---------|------|--------------|-----------|--------|----------|

!! | vmr        | concentration                                    | species concentration                    |
mole/mole |    1 |real        | kind_phys | inout  | F        |

!! | TimeStart  | chem_step_start_time                             | Chem step start time                     |
s       |    0 | real         | kind_phys | in     | F        |

!! | TimeEnd    | chem_step_end_time                               | Chem step end time                       |
s       |    0 | real         | kind_phys | in     | F        |

!! | j_rateConst| photo_rate_constants                             | photochemical rates constants            | s-
1     |    1 | real         | kind_phys | in     | F        |

!! | k_rateConst| gasphase_rate_constants                          | k rate constants                         | s-
1     |    1 | real         | kind_phys | in     | F        |

!! | errmsg     | ccpp_error_message                               | CCPP error message                       |
none    |    0 | character    | len=512   | out    | F        |

!! | errflg     | ccpp_error_flag                                  | CCPP error flag                          |
flag    |    0 | integer      |           | out    | F        |

!!
```

chemistry_driver_xxx_finalize routine (will show mozart, but Rosenbrock values are identical)

```
!> \section arg_table_chemistry_driver_moz_finalize Argument Table

!! | local_name | standard_name                                    | long_name                                 |
units   | rank | type         | kind      | intent | optional |

!! |------------|--------------------------------------------------|-------------------------------------------
|---------|------|--------------|-----------|--------|----------|

!! | errmsg     | ccpp_error_message                               | CCPP error message                        |
none    |    0 | character    | len=512   | out    | F        |

!! | errflg     | ccpp_error_flag                                  | CCPP error flag                           |
flag    |    0 | integer      |           | out    | F        |

!!
```