

# LFM-MIX-1.0.2

## Table of Contents

- [LFM-MIX 1.0.2](#)
  - [Change log](#)
  - [Verification Runs](#)
  - [Maximum RMS error tolerances](#)

## LFM-MIX 1.0.2

Released November 3, 2008

Download:

- [LFM-MIX-1\\_0\\_2-pre\\_valid.tar.gz](#) (Login required; email schmitt <at> ucar <dot> edu for an account)  
md5 checksum: 221b6c70b0c530c7f537905272559d52
- To upgrade from a previous release:
  - Note: You should be able to re-use any prerequisites built for a previous LFM-MIX release.
  - un-tar the code into LFM-MIX-1\_0\_2-pre\_valid
  - copy your Make . \$MACHINE file into LFM-MIX-1\_0\_2-pre\_valid/env/
  - To ensure the install works properly on your system, we recommend that you run the standard tests, starting with [the unit tests](#), and proceed to [test the LFM](#) and [LFM-MIX](#).

## Change log

- Repository revision: 672
- New Features:
  - Repository revision number stored in HDF files (Revisions 620-638)
  - Adhoc LFM-MIX interface... We strongly urge users to stick with the InterComm interface though... (Revisions 534-557)
- Changes
  - Re-ordering LFM-MIX communication; LFM exchanges with ionosphere after time-stepping (revision 587)
- Bug fixes:
  - Northern Hemisphere stand-alone LFM ionosphere variables read in properly (revision 655)
  - Platform-dependent (64-bit Linux) bug where Pedersen & Hall conductances were set to invalid values (revision 651)
  - No more NaNs in the ionospheric field aligned current (Revisions 572, 574)
  - Flux & Energy set incorrectly for LFM Ionosphere (Revision 644)
  - Adding LFM-MIX verification files, removing python dependency (revision 638)
  - Cleaner/faster build process (revision 546)
  - DateTime precision could be off by +/- 1 second (revision 566)
  - test-arrays.F compile issue (revision)
  - Various minor fixes

## Verification Runs

[Click here for LFM and LFM-MIX base-case data, animations and CISM\\_DX networks](#)

| Compilers | LFM          | LFM          | LFM          | LFM          | LFM-MIX      | LFM-MIX      | LFM-MIX      |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| N/A       | utio-short   | utio-long    | step-short   | step-long    | utio-long    | utio-short   | step-long    |
| PGI       | light        | light        | light        | light        | tor          | tor          | tor          |
| IBM       | <u>bfire</u> | <u>bfire</u> | <u>bfire</u> | <u>bfire</u> | <u>bfire</u> | <u>bfire</u> | <u>bfire</u> |
| Intel     | wjet         | wjet         | wjet         | wjet         | <u>wjet</u>  | <u>wjet</u>  | <u>wjet</u>  |

Key:

- underlined = base-case run
- Bluefire and lightning use file exchanges for LFM-MIX. All other systems use InterComm for LFM-MIX.

## Maximum RMS error tolerances

RMS errors that we computed on [various computers](#). You may wish to compare your data from the [LFM verification](#) and [LFM-MIX verification](#).

| *ION var *  | wjet | wjet-l | *tor * | light | light-l |
|-------------|------|--------|--------|-------|---------|
| *x2ion *    | 1e-7 | 1e-7   | 1e-7   | 1e-7  | 1e-7    |
| *y2ion *    | 8e-8 | 8e-8   | 8e-8   | 8e-8  | 8e-2    |
| *x_interp * | 2e-7 | 1e-7   | 1e-7   | 1e-7  | 1e-7    |

|                 |      |      |      |      |      |
|-----------------|------|------|------|------|------|
| *y_interp *     | 2e-8 | 2e-8 | 1e-8 | 1e-8 | 4e-2 |
| *rho *          | 0    | 0    | 0    | 0    | 0    |
| *c0 *           | 5e-8 | 1e-2 | 4e-8 | 3e-8 | 1e-2 |
| *curnorth *     | 0    | 0    | 0    | 0    | 0    |
| *potnorth *     | 3e-3 | 3e-1 | 1e-4 | 9e-4 | 3e-2 |
| *SigmaH_north * | 9e-7 | 8e-3 | 4e-7 | 5e-7 | 6e-3 |
| *SigmaP_north * | 8e-7 | 7e-3 | 4e-7 | 5e-7 | 2e-2 |
| *fluxnorth *    | 0    | 3e-2 | 0    | 0    | 2e-2 |
| *avE_north *    | 9e-7 | 2e-2 | 2e-7 | 2e-7 | 2e-1 |
| *cursouth *     | 0    | 0    | 0    | 0    | 0    |
| *potsouth *     | 4e-2 | 7e-3 | 4e-2 | 1e-4 | 3e-1 |
| *SigmaH_south * | 8e-7 | 6e-3 | 5e-7 | 6e-7 | 7e-3 |
| *SigmaP_south * | 7e-7 | 3e-2 | 4e-7 | 6e-7 | 6e-3 |
| *fluxsouth *    | 0    | 3e-2 | 0    | 0    | 2e-2 |
| *avEsouth *     | 7e-7 | 3e-2 | 3e-7 | 3e-7 | 2e-2 |

|            |      |        |      |       |         |          |
|------------|------|--------|------|-------|---------|----------|
| *MHD VAR * | wjet | wjet-l | tor  | light | light-l | bfire-LM |
| *X_grid *  | 0    | 0      | 0    | 0     | 0       | 0        |
| *Y_grid *  | 0    | 0      | 0    | 0     | 2e-1    | 0        |
| *Z_grid *  | 0    | 0      | 0    | 0     | 1e-1    | 0        |
| *rho_ *    | 0    | 0      | 0    | 0     | 0       | 0        |
| *vx_ *     | 1e-2 | 2e-1   | 7e-2 | 4e-3  | 2e-1    | 2e-1     |
| *vy_ *     | 6e-3 | 3e-1   | 1e-1 | 4e-3  | 3e-1    | 1e-1     |
| *vz_ *     | 8e-3 | 3e-1   | 1e-2 | 8e-6  | 3e-1    | 1e-1     |
| *c_ *      | 3e-6 | 1e-2   | 2e-4 | 3e-6  | 1e-2    | 2e-1     |
| *bx_ *     | 0    | 2e-1   | 1e-2 | 0     | 1e-1    | 1e-4     |
| *by_ *     | 0    | 2e-1   | 3e-2 | 0     | 2e-1    | 5e-4     |
| *bz_ *     | 0    | 9e-2   | 4e-3 | 0     | 6e-2    | 6e-3     |
| *bj_ *     | 1e-2 | 2e-1   | 2e-2 | 7e-5  | 1e-1    | 2e-4     |
| *bj_ *     | 7e-5 | 2e-1   | 2e-2 | 8e-5  | 1e-1    | 1e-2     |
| *bk_ *     | 1e-3 | 2e-1   | 7e-2 | 2e-4  | 2e-1    | 7e-2     |
| *ei_ *     | 6e-2 | 3e-1   | 1e-1 | 5e-2  | 3e-1    | 1e-1     |
| *ej_ *     | 3e-2 | 3e-1   | 1e-1 | 3e-2  | 2e-1    | 8e-1     |
| *ek_ *     | 1e-2 | 2e-1   | 9e-2 | 2e-3  | 2e-1    | 4e-2     |

|            |      |       |
|------------|------|-------|
| *MIX VAR * | tor  | bfire |
| *Grid X *  | 0    | 0     |
| *Grid Y *  | 0    | 0     |
| *Poten N * | 4e-1 | 1e-1  |
| *Poten S * | 2e-1 | 2e-2  |
| *FAC N *   | 2e-2 | 0     |
| *FAC S *   | 2e-2 | 0     |
| *Peder N * | 2e-4 | 6e-4  |
| *Peder S * | 3e-4 | 1e-4  |

|            |      |      |
|------------|------|------|
| *Hall N *  | 2e-4 | 1e-4 |
| *Hall S *  | 2e-4 | 2e-4 |
| *Avg E N * | 4e-2 | 5e-4 |
| *Avg E S * | 4e-2 | 7e-4 |
| *Flux N *  | 3e-2 | 1e-3 |
| *Flux S *  | 3e-2 | 1e-3 |
| *NW Sp N * | 1    | 1    |
| *NW Sp S * | 1    | 1    |