

CALPUFF: Status and Update

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9th Conference on Air Quality Modeling

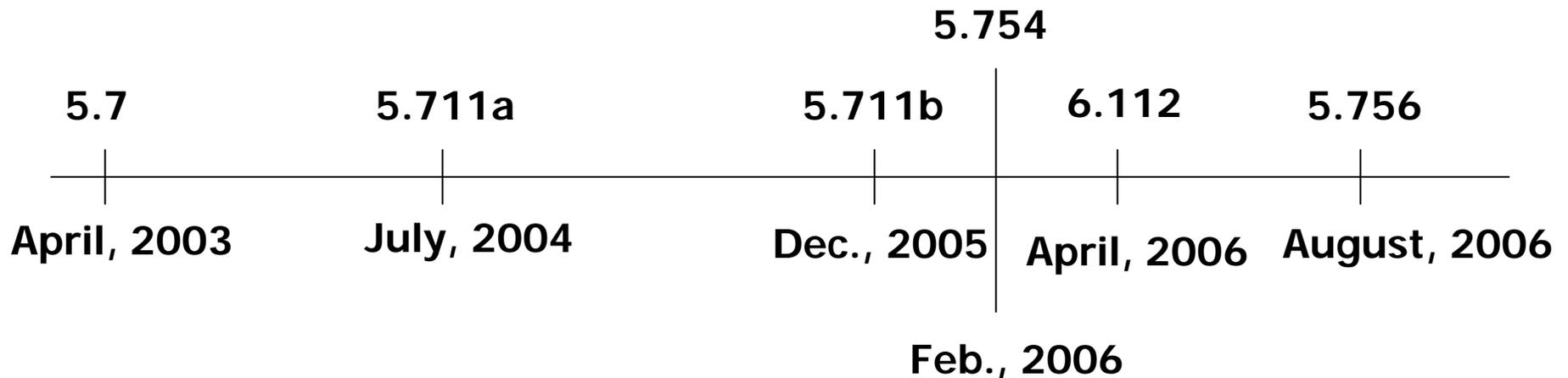
October 9, 2008

CALPUFF History

- CALPUFF modeling system:
 - CALPUFF, a non-steady-state Lagrangian puff model
 - CALMET, a diagnostic 3-D wind field model
- CALPUFF was promulgated April 2003 as EPA's preferred model for long-range transport (LRT) applications, beyond 50 km, primarily for Class I increments
- CALPUFF developer (Earth Tech) arranged to maintain control of code development and distribution and copyrighted code
- CALPUFF also identified in Appendix W for near-field applications involving "complex winds" on a case-by-case basis (more on this later)
- CALPUFF also used for Class I AQRV analyses, not under Appendix W purview

Scorecard of CALPUFF Versions

- 5.7 April 2003 (promulgated version)
- 5.711a July 2004 (previous regulatory)
- 5.711b December 2005
- 5.754 February 2006 (original VISTAS)
- 5.756 August 2006 (latest VISTAS)
- **5.8 June 2007 (current regulatory)**
- 6.112 April 2006 (MMS)



FEDs Discussions on CALPUFF: Spring 2006

- Reason: Earth Tech sells CALPUFF rights to TRC (April 2006) and EPA experiences difficulties in assessing/ updating to VISTAS version 5.754
- Representatives from Federal Agencies discussed current situation with CALPUFF (status and regulatory updates)
 - EPA
 - FLM
 - MMS
- Discussed the following issues:
 - lack of adequate documentation
 - responsiveness to issues by developer
 - need for funding to address any issues from Federal community, despite regulatory classification of the model

EPA contacts TRC: June 30, 2006

- CALPUFF must meet Appendix W requirements for regulatory models, Section 3.1.1(b)-(d):
 - *.exe to run on a common platform
 - current model documentation
 - input/output test data w/model
 - users can operate model from available documentation
 - documentation must include comparison w/tracer data
 - model/code cannot be proprietary

TRC to EPA response: July 11, 2006

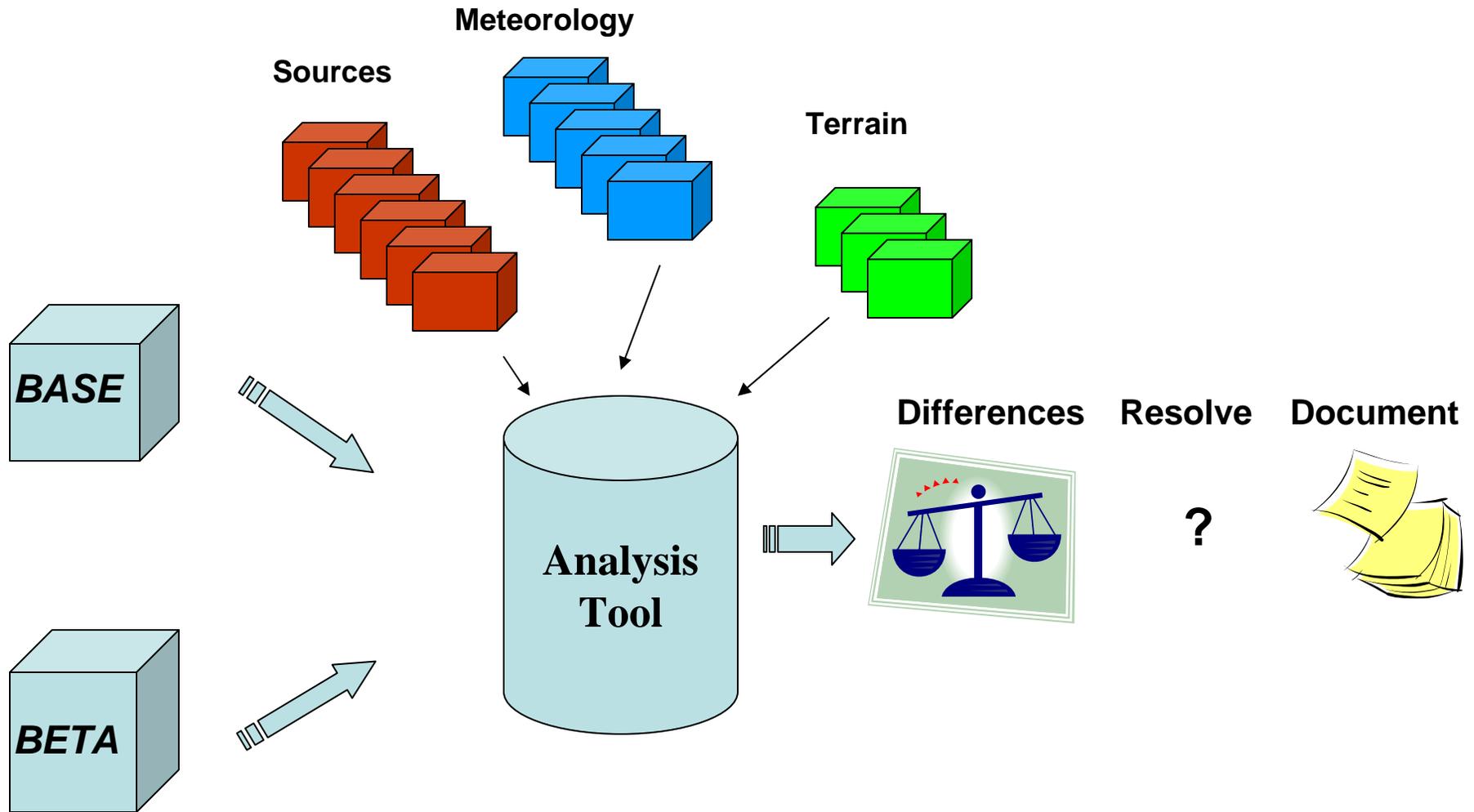
- TRC provides copy of Use Agreement
- States that ... “Permission to modify the Fortran computer codes is granted to users with the provision that modified versions of the model codes must be provided promptly to TRC, along with appropriate written documentation and instructions for use”

TRC to EPA response: July 11, 2006

- Use Agreement also states...

“It is the user's responsibility to determine if the CALPUFF modeling system is appropriate for any particular application, and the user assumes all responsibility and liability for its use.”

CALPUFF Update Tool



CALPUFF Regulatory Update: Version 5.7 to 5.711a

- Model Change Bulletin-A provided description of changes
 - Only minor changes in coding
- Application of Update Tool showed minimal differences/impacts on concentrations
 - Clearly attributed differences to bug fixes
- Approved 5.711a - June 15, 2006

CALPUFF Regulatory Update

- Began update process with v5.754 in June, 2006
- Engaged with TRC in discussions to understand 5.711a vs. 5.754 differences
- August 15, 2006—Received e-mail from TRC indicating a new VISTAS v5.756 would be released
- OAQPS decided to focus on update for new VISTAS v5.756
 - newest features, latest corrections, etc. for user community (including MMS updates for over water)

CALPUFF Regulatory Update: 5.711a -> 5.756

- Found large ‘unresolved’ differences between 5.711a/5.756
 - CALMET versions (5.53a vs. 5.726)—up to 83% for scenarios 2, 3, (Pacific NW), 5 (deep valley)
 - CALPUFF versions (5.711a vs. 5.756)— up to 7% for scenario 5 (deep valley)
- **PROBLEM** = incomplete documentation
 - Missing Model Change Bulletins (MCBs)
 - No in-code comparisons
 - Inadequate model documentation

While we wait for response . . .

- BART usage
 - “Good faith” effort to use “best” available model version
 - Attempt to be “consistent” with App W and ‘wall off’ any potential bad precedents
- OAQPS becomes increasingly concerned about NSR/PSD permit modeling
 - Appendix W provides “rules of the game”

Clearing the Air on CALPUFF

- OAQPS makes clear position statement at monthly call with RO modelers (January 2007)
- Region 4 communicates with VISTAS so Pat Brewer contacts OAQPS and facilitates discussion with TRC (Feb 2007)
- Request for documentation from TRC via VISTAS (Feb. 2007)
- Received documentation from TRC on March 15, 2007

CALPUFF Modeling System: Update on Recent Activities

- OAQPS updated regulatory version to 5.8 in June 2007
 - CALMET, CALPUFF, CALPOST
- OAQPS has multiple concerns on science and code implementation and has undertaken evaluations
 - Currently completing performance evaluations, both near-field and LRT, and preparing documentation for release prior to 9th Modeling Conference
- Pending assessment of v5.8'n' and v6 updates
 - Currently “on hold” due to broader issues
- Goal = Get firm handle on science and its implementation so use of model with confidence in regulatory applications; engage with community at 9th Modeling Conference

Game Plan & Next Steps

- Post v5.8 update documentation on SCRAM
- Issue near-field “Clarification Memo”
- Post additional documentation of technical issues/concerns with near-field applications
- Complete CALPUFF performance evaluations and document
- Compile list of issues and recommendations
 - June workshop in Denver w/ R/S/L modelers
 - Communicate issues & recommendations to TRC/Scire
 - Discuss with FED users group (short-term and long-term implications)
- Engage community at 9th Modeling Conference, Oct 2008
 - Update on status, issues, and applications
 - Performance evaluation & findings
 - Science and implementation issues
- OAQPS expects to fund thorough and fully informed peer-review of CALPUFF modeling system