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Interactive comment on "The Meteorology-Chemistry Interface Processor (MCIP) for the CMAQ modeling system" *by* T. L. Otte and J. E. Pleim

Anonymous Referee #4

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The authors document the current processing in the Meteorology-Chemistry Interface Processor (MCIP) component of the Community Multiscale Air Quality (CMAQ) modeling system. There are a few places in the manuscript where it is unclear where MCIP sits within the CMAQ modeling system. For example, in the abstract, it is mentioned that MCIP "is a vital piece of software within the CMAQ modeling system" (see L7-8, P1450) and that it "acts as both a post-processor to the meteorological model and a pre-processor to the CMAQ modeling system" (see L10-11, P1450). This is confusing; how can MCIP be a part of and a pre-processor to the CMAQ modeling system at the same time. I would suggest including a schematic diagram of the structure of the CMAQ modeling system, and explaining this diagram in order to clarify where

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MCIP sits within it (e.g. reconfiguration of the output files from a meteorological model for the CTM, and for the plume rise calculation in the emissions data preprocessor). There are too many instances of the expression "CMAQ modeling system", which make some parts of the text difficult to read. For instance, the authors could replace "The CMAQ modeling system" by "It" L24-25, P1450 and L1, P1451. Please minimize the occurrence of the expression "The CMAQ modeling system" in the text. The statement "There are three primary components of air quality modeling systems: the meteorological fields, the emissions inputs, and the chemical transport model (CTM)." (see L5-6, P1451) is correct only for offline air quality modeling systems. I would suggest adding "offline" before "air quality modeling systems". Also, I would move the sentences on 'offline modeling' (L27, P1451 to L3, P1452) after the first sentence of the paragraph L5, P1451. In the abstract, it is claimed that the manuscript provides "an updated overview of MCIP, documenting the scientific changes that have been made since it was first released as part of the CMAQ modeling system in 1998". While the manuscript do provide an updated overview of MCIP in a technical sense, it does not discuss in detail the scientific changes that have been made to it. Maybe the authors could include a table summarizing the major scientific changes that have been made to it since 1998 and refer to this table in the text. Having said that, the manuscript fits well within the scope of GMD and provides an excellent overview of MCIP. Hence, I recommend the manuscript for publication in GMD after the authors clarify the minor points raised in this review. Some additional comments/suggestions are given below:

P1451, L23: I would suggest changing "and pre-processes these data for the CMAQ system" to "and pre-processes them for the CTM".

P1452, L4: Please change "and air quality modeling" to "and for the CTM".

P1452, L15: Please change "The goal of the MCIP design is to limit" to "MCIP is designed to limit".

P1452, L26: Please change "including the emissions processing component" to "in-

cluding its emissions processing component".

P1455, L1-23: Does MCIP ensure mass conservation when using 'layer collapsing'? Since "Layer collapsing is performed in MCIP as a final step before the output is created" (see L5-6, P1455) and "The layer fields are collapsed using simple vertical interpolation" (see L7-8, P1455), it is unclear whether MCIP ensures mass conservation or not when using 'layer collapsing'.

P1556, L5: Please check whether one should use "WRF Model" or "WRF model" and use it throughout the text.

P1556, L6-7: Please change "to the chemical transport model in the CMAQ system" to "to the CTM".

P1556, L24 and L28: Please change "CMAQ" to "the CTM".

P1557, L1 and L5: Please change "CMAQ" to "the CTM".

P1558, L3: Please replace "the WRF model output file" by "this file".

P1558, L14: I would suggest replacing "spacing" by "resolution".

P1558, L25: Please change "feedbacks" to "feedback".

P1463, L12: Please change "WRW" to "WRF".

P1465, Equation 12: There is a '-' sign missing on the right-hand side of Equation 12.

P1468, L12: Please change "CMAQ" to "the CTM".

P1472, L17: Please change "CMAQ" to "to the CMAQ modeling system".

P1485, caption of Fig. 1: CMAS is not defined.

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