The overall impression is that that the authors have done a very nice job, but also that the article lacks regarding two important parts: Description of the ammonia emissions is insufficient, and the other part is that this work needs to be compared and discussed with results obtained in work with similar models and methods.

The authors have completely failed to recognize the rather similar work performed of a Danish research group more than 15 years ago. This Danish group used a similar type of model, the ACDEP model, and they even applied a near to identical chemical scheme (Hertel et al, 1995) including a parameterization of the formation of ammonium nitrate, other inorganic as well as organic nitrates. This model has been extensively used for studies to simulate ammonia concentrations (de Leeuw et al., 2003; Skjøth et al., 2002; Skjøth et al., 2004) and nitrogen depositions (Hertel et al., 2002; Hertel et al., 2003) and uses a recently open source model that dynamically handles ammonia emissions (Skjøth et al., 2004; Gyldenkærne et al., 2005; Skjøth et al., 2011). The emission model is already successfully implemented in the DEHM (Brandt et al., 2012) and the Unified EMEP model (Berge, 2010) and underway in the EMEP4UK model (Reis et al, 2011). Furthermore, several reviews have highlighted the applied approach as a needed requirement for many model calculations with respect to ammonia and ammonium containing particles (Hertel et al., 2006; Hertel et al., 2012; Menut and Bessagnet, 2010). Other groups in Europe have also used similar but more simple methods as those that are based on the FRAME model (Fournier et al., 2004; Kryza et al., 2011; Zhang et al., 2011) that were originally developed for the English area (Fournier et al., 2004). Or the TREND model (Asman, 2011), applying a simple seasonal variation of the ammonia emission.

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