

REVIEW of the article “**Multi-thermals and high concentrations of secondary ice: A modelling study of convective clouds during the ICE-D campaign**”

by Cui et al.

The manuscript is improved in many aspects as compared to the previous version. However, there are still some grammatical and other minor mistakes that authors need to address before accepting it for final publication.

Minor comments:

Abstract: line 15- change parametrization to parameterization

Line 24: change ice nucleating to ice-nucleating

Line 30: delete ‘being’

Line 46: change minerology to mineralogy

Line 49: **the** ice-nucleating sites...

Line 50: **the** formation

Line 53: change ‘do not active’ to ‘do not act’

Line 58: feldspar **are** particularly

Line 70: **the** mechanical breakup

Line 80: delete the from ‘ the future research’

Line 97: change falling into to fall into

Line 105: change large scale to large-scale

Line 107: change ‘projects of layer..’ to project on layer....

Line 112: remove ‘as’ before greater.

Line 113: You have used secondly two times. Modify the sentences.

Line 121: is **included** in section 3 or **given** in section 3

Line 124: add space between UK’s and FAAM

Line 126: change on board to onboard

Line 129: remove the full stop after ‘micrometers’

Line 130: define 2D-S

Line 133: polarisation

Line 146: define MSL

Line 156: hundred **meters**

Line 159: change 'of several passes from the aircraft measurements' to in several passes based on the aircraft measurements.

Line 163-164: This is not very clear. What is the reason behind 'secondary ice production most likely occurred'.

Line 172-175: Split this into separate sentences.

Line 175: is '.and the transition and interaction between different species' is part of the previous statement.

Line 177: One of the objectives **of our study** is to. Remove 'the' after freezing efficiency on

Line 178: As **mentioned** in the introduction ..

Line 180: Similarly to what? This statement has no connection with the previous one.

Line 181: ... field measurements of **INPs.....** Replace 'the influence on cloud simulations' by 'its influence on the simulated cloud forcing in a global model.'

Line 189: Replace ' As a result of this uncertainty by 'Considering these uncertainties'

Line 194: replace model runs by tests

Line 194-196: This statement is not very clear. Please split into separate sentences

Line 198: **The** early onset examined

Line 199: The Cooper10x

Line 200: The early onset 1 &...

Line 203: Which general type of INPs?

Line 205: the INP numbers were **increased**. Why a factor of 3.3, Any particular reason?

Line 206: 2-3 km

Line 212: was 1 **minute**.

Line 215: water **vapor** mixing ratio

Line 225: a rate **of** about 150

Line 228-229: Replace 'At 25 min, the cloud top reached about 8 km' by 'The cloud top had reached around 8 kilometers at 25 minutes'.

Line 232: Delete 'down'

Line 246: .. with a maximum **of**

Line 251: change was identical to was identical. That of **the** control run...

Line 259: high variability in **the** INP population

Figure 3: IN captions replace the comma with a full stop after 'Figure 3'.

Figure 4: In captions change ration to ratio. Also, follow the same structure of caption throughout the manuscript. e.g. (a) potential temperature and (b) mixing ratio

Figure 13, 14: In the caption, these figures are mentioned as Figur N13, N14. In Figure 14, please mention the width of each CIP images strip. It will give an idea about the particle size.

Figure 4: Altitude is above mean sea level/above ground?

Line 263: Move 'as plotted in Figure 7' at the end of the statement. Remove comma after the freezing efficiency. Change was to was.

Line 278: replace 'similar concentrations of the primary and the secondary ice production to the observations made in some passes' by 'total ice concentration observed in some passes'

Line 287: Replace 'a sensitivity and the control' by 'the sensitivity tests and the control'

Line 289: full stop after 'between the two runs'

Line 291: replace 'and the maximum was' by 'reaching a maximum concentration of about'

Line 295: Don you mean cloud **water** mixing ratio. Please clarify

Line 304-306. Please clarify this statement. It is not clear what the authors want to say here.

Line 310: change mixing ration to mixing ratio

Line 323: further **increased**

Line 324-325: Rewrite the statement. more/less can be written as more (less). Replace higher temperature with higher temperatures.

Line 327: there **was a** slight increase at the upper levels

Line 332: secondary ice in **the** concentration

Line 344: by modified you mean by increasing. Please clarify. Why 3.3?

Line 346: that dust alone **as a source of INPs** was

Line 349: freezing rate and onset temperature of what?

Line 350: delete the from 'impact of the cloud'

Line 361: change updraght to updraft.

Line 383-384: delete 'down'

Line 422: Need a full stop after updraughts and downdraughts. What is the Knight mechanism?

Line 423: delete the before 'similar temperature range'

Line 427: **The** recent development

Line 442: **the** mountainous **regions**

Line 447: replace 'to follow' by following

Line 452: goes to **the** correct height

Line 465: remove 'the' before 'observed'.

Line 473: at **a** higher altitude

Line 487: delete 'the' before 'the cloud microphysics'. Remove full stop before (Field et al..)