**Cover letter**

We thank the reviewers for the comment provided. We list the edits below.

*Reviewer 1:*

I would suggest that the authors should point out that the volumetric estimation for CO2 storage using Equation 2 is a theoretical maximum storage volume. The actual CO2 storage volume, however, depends on a dynamic process of CO2 injection and displacement of original fluid in place, therefore not every point of the formation will be driven to the irreducible fluid saturations. In addition, other factors such as high permeability thief zone, faults, etc., can significantly impact the CO2 storage efficiency. In these cases, dynamic flow and geomechanical models can play an important role in estimating the actual CO2 storage capacity.

Added the below paragraph - “It is important to note that Equation 2 represents a theoretical maximum storage volume. The actual amount of CO2 stored in the subsurface will be a function of the dynamic behaviour of injected CO2 into the subsurface, and the subsequent displacement of the non-wetting phase fluid. Not every point of the reservoir will be accessible to CO2 storage or driven to irreducible water saturations. In addition, factors such as reservoir quality (permeability), the presence of faults and fractures as well as zones of differential pressure (thief zones) can have a significant impact on the CO2 storage efficiency, in which case, the use of dynamic flow and geomechanical models play an important role in estimating the the bounds of the CO2 storage capacity.”

*Reviewer 2:*

1. I found this submission very easy to read and follow. I have noted below some trivial items which may have already been addressed at a subsequent reading.  
   Page 8, Heading 'Fresh water vs Saline Aquifer': Increasing needs to change to increases. Constrain needs to change to constraint...line 6.
2. Changed Increasing to ‘an increase’ - “CO2 solubility typically decreases with an increase in salinity…”
3. Changed Constrain to ‘constraint’ - “contamination of water resources can become a constraint…”
4. Page 9, Last sentence: Delete the word 'than'.
5. Deleted the word ‘than’ - “If there is higher confidence data like core measurements, petrophysicists…”
6. Page 11, Paragraph I: 1st sentence: Delete 'a'...should read...into low pore pressure , depleted oil . 3rd line 3rd paragraph, 'results' should be changed to 'result'. (Line 9)
7. Deleted the word ‘a’ -“The injection of high-pressure CO2 into low pore pressure, depleted oil…”
8. Changed the word ‘results’ to ‘result’ - “The significant pressure gradients that develop between the under-pressured reservoir and the over-pressured CO2 could result…”
9. Page 12, 2nd sentence delete 'a'. Should read 'For practicing petrophysicists'...currently it reads 'For 'a' practicing petrophysicists.  
   Item 'J': Cased Hole and Production Logs: Last paragraph 'is CO2' should read 'if CO2 is being injected'.
10. Deleted the word ‘a’ - For practicing petrophysicists…”
11. Changed the word ‘is’ to ‘if’ - “A cased hole resistivity tool (CHRT) can serve a similar function, particularly if CO2 is being injected into a saline aquifer.”
12. Page 13: Clarification for Table 1: How would you monitor the sea-bed for gas expulsion?...unless it was significant.

Its not easy to monitor minor expulsion. It can also be quite expensive. One would need to observe for gas bubble trains/plumes and measure concentrations of dissolved gas within the vicinity of the injected well. This can be done using technology like sonar, sniffers, sampling meters, subsea ROVs etc. This is, however, par for the course as similar technologies is also used in monitoring pipeline and flowlines to rigs/ FPSO etc. One key difference would, however, be the need to establish a baseline, by monitoring for a period before injection even starts.

Significant expulsions can be observed on the surface; however, if you can see it on the surface, things are much worse down below.

1. Page 14, 1st paragraph: Figure 9 is double typed,. Also happens in 2nd paragraph. 3rd paragraph, 2nd sentence reads 'This is account for'...should read 'this accounts for'
2. Deleted ‘(Figure 9)’
3. Changed wording to -“This accounts for the more detailed dynamic observations and rock-fluid and fluid-fluid interactions.”
4. Page 17, above Figure 11: There's a gap that needs removing. Also 'with' at the end of 2nd sentence needs deleting.
5. Removed Gap,
6. Removed ‘with’ at the end of the 2nd sentence.
7. Page 18: 1st sentence below Table 4 is confusing....'to mature continue maturing through to contingent storage resources'.
8. Changed wording to - “To continue maturing storage resources through to a contingent classification (C - discovered and sub-commercial),…”