The authors describe a method of calculating a value for the Brunt-Väisälä (BV) frequency, that can be used at the altitude of OH* emissions near the mesopause (denoted OH*-equivalent BV frequency), based on temperature and volume emission rate (VER) profiles from the SABER instrument on the TIMED satellite.

They use 14 years of SABER profiles (2002-2015) in the vicinity of the Alpine region (43.93–48.09°N and 5.71–12.95°E) to obtain a climatology of the BV frequency in that region. They demonstrate that the BV frequency has an annual pattern which is repeated from year to year, even though there are considerable differences between individual years, with the largest variability occurring in the winter season. The climatology is specified in terms of an annual, semi-annual and ter-annual oscillations which account for 74% of the variation observed. Almost 98% of all of the nightly averaged OH*-equivalent BV frequencies fall within the range of the climatology ±10%.

The authors propose to use this climatology together with measurements of gravity waves obtained from a network of GRIPS-type (Ground-based Infrared P-branch Spectrometers) instruments already deployed in the Alpine region to enable them to estimate values of the nightly averaged density of potential energy (per unit mass) for the gravity waves detected. In an earlier publication, the authors reported that a 10% uncertainty in the BV frequency gives rise to a 20% uncertainty in the density of wave potential energy.

The manuscript is well organised and the intention of the authors is clear in almost all instances (however, see some of the specific comments below). The methods used to calculate the OH*-equivalent BV climatology are valid (see specific point relating to equation 4 on page 6) . The approach outlined could be employed by other ground-based observers, and it is therefore a valuable contribution to this field of study. The work is suitable for publication in AMT, provided that the specific points below are addressed.

Specific comments
Page 1, line 14; rephrase 'the derivation of … Brunt-Väisälä frequency provided.' as 'the derivation of the density of gravity wave potential energy, provided that the Brunt-Väisälä frequency is known.'
Page 2, line 3; replace 'like for example' by 'such as'.
Page 2, line 8; g is the acceleration due to gravity, not the gravitational constant.
Page 2, line 17; omit the word 'etc'.
Page 2, line 20; the meaning of the phrase ' … nor the relation of potential and kinetic energy.' Is not clear. Please reword the entire sentence.
Page 3, line 1; Γ (more usually written Γ_d when referring to the dry adiabatic lapse rate) is defined as $\Gamma_d = -\dfrac{dT}{dz}$. Therefore the minus sign should be omitted and the phrase 'a value of' inserted before the numerical value.
Page 3, line 4; suggest 'the direct calculation of' instead of 'to directly calculate'.
Page 3, line 9; suggest 'do not provide temperature … ' instead of 'not even temperature …'.

Page 3, lines 12-15; this sentence is unwieldy. It should be separated into two sentences. The first sentence should end after 'the BV frequency' on line 13. The second sentence might be rephrased along the lines: 'While the latter might be of higher accuracy in most cases, lack of coincidence in either time or space of the complementary measurement with the passage of a wave could result in unrepresentative BV values'.

Page 3, line 24; insert a comma after '(40°N, 88°W)'.

Page 3, line 26; for clarity use '2.12×10^{-2} s^{-1}' instead of '$2.12 \cdot 10^{-2}$ s^{-1}' and use '(≈ 4.9 min)' instead of '($= 4.9$ min)' on line 27.

Page 4, line 12; replace 'denoted with' by 'denoted as'.

Page 5, line 6; omit the word 'well' before 'suitable'.

Page 5, lines 9/10; suggest rewording the sentence as follows: 'An overview of the large number of SABER publications is available at http://saber.gats-inc.com/publications.php.'

Page 5, line 12; '15 μm' instead of '15 um'.

Page 6, line 8; why does equation 4 contain $\dfrac{1}{|\vec{f}|}$ instead of $\dfrac{1}{\sum\limits_{i} f_i}$?.

Page 6, line 12; rephrase as 'This was also the approach presented and discussed in Wüst et al. (2016) and Wüst et al. (2017).'.

Page 6, line 16; replace 'unproportionally' by 'disproportionally'.

Page 6, line 24; replace 'whereas' by 'although'.

Page 7, line 6; '0.023 s^{-1}' would seem to be more accurate than '0.0235 s^{-1}' for the OH*-equivalent BV value.

Page 7, lines 14/15; suggest 'and maxima at 9 km, 8 km and 8 km approximately for DOY 40 (February), 110 (April), and 285 (October) respectively (thick line in fig. 2 (b)).' instead of 'and three maxima … and 285 (October, thick line in fig. 2 (b)).'.

Page 7, line 21; replace 'mid' by 'middle'.

Page 7, line 22; replace 'motivates' by 'suggests' and omit 'a' before 'harmonic'.

Page 7, line 33; suggest replace the final two sentences by 'This 60-day oscillation is probably not a geophysical period but the may result instead from the local time sampling of the satellite or the fact that it performs a yaw maneuver once every 60 days (rotating through 180 degrees) to keep SABER viewing away from the sun.'.

Page 8, line 2; The meaning of the sentence beginning 'Depending on the accuracy needed … ' is not clear. Please rephrase to clarify the intended point .

Page 8, line 6; please be consistent in the use of 'DoY' or 'DOY' (lines 12-16 on page 7).

Page 8, line 16; replace 'which influences also Γ.' by 'which also influences Γ.'.

Page 8, lines 16-18; the sentence beginning 'According to Wüst et al. (2017) …' is confusing. It appears to confuse the variation of g and Γ with altitude, and the effect of both of these on N^2. The value and unit quoted on line 18 (9.81 K/km) as stated refer to g, but it is actually the unit of Γ. Please correct this sentence.

Page 8, lines 24-25; suggest 'This behaviour has been reported previously by Bills and Gardner (1993) and Wüst et al. (2016).' instead of the sentence 'This behaviour … for example.'

Page 8, line 27; suggest 'In contrast to the approach presented here … ' instead of 'Different to the approach presented here … '.

Page 9, line 1; suggest 'Nevertheless, the SABER-based OH*-equivalent BV frequency is systematically higher than the one based on CIRA (0.019–0.022 1/s) regardless of the calculation method employed here or in Wüst et al. (2016).' instead of 'Independent of these facts, … CIRA (0.019–0.022 1/s)'

Page 9, line 2; Please be consistent in the typography of units used for BV values (1/s) used here and also on page 17 and page 18 (y-axis label) or (s^{-1}) used on pages 3, 7 and 10.

Page 9, line 4; replace 'and in parts also' by 'in some instances'; replace 'on case study base' by 'on a case study basis'.

Page 9, line 6; suggest replace 'base' by 'basis'.

Page 9, lines9-10; the emission altitude presented in Figure 2(a) is <u>not</u> the mean OH(3-1) emission altitude but is instead the emission altitude of the SABER OH-B channel as described on page 5 (lines 21-26). Figure 2(a) for the period September to March suggests that the mean emission altitude range is 85-87 km, not 86.0–86.5 km as stated.

Page 9, lines 26 and 30; please use 'km/year' as the unit instead of 'km/a'.

Page 10, line 5; use '2.35×10^{-2} s^{-1}' instead of '$2.35\cdot10^{-2}$ s^{-1}' and suggest 'during 2002-2015' instead of 'during 14 years'.

Page 10, line 8; consider inserting the word 'mean' before 'OH*-'.

Page 10, line 11; consider inserting the word 'mean' before 'curve'.

Page 12, lines 32-33 and page 13, lines 1-2; these references are not in alphabetical order of surname.

Page 15, Table 1; Why not use column headings "annual", "semi-annual" and "ter-annual" (using quotation marks around each heading to indicate that they are approximate periods) instead of '1st oscillation   2nd oscillation   3rd oscillation'? Figure 3 on page 20 uses 'annual, semi-, and ter-annual' to describe these oscillations.

Page 15, lines 4-5; use '2.32×10^{-2} s^{-1}' instead of '$2.32\cdot10^{-2}$ s^{-1}'

Page 17, caption of Figure 1; omit 'a' in '… but show a comparatively ….'.

Pages 18/19/20, label on x-axis is written as 'DoY', whereas it is written as 'DOY' on page 7 (lines12 – 16) and page 8 (line 6) as 'DoY'. Please be consistent in this label.

Page 21, caption of Figure 4, final sentence; suggest 'The temperature values are offset by +30 K per month for all months except January.'.