Figure S1. Metamorphic map of the Buchan block and adjacent Barrovian domain from Fig. 1b, with mineral assemblages from outside the four inset maps plotted. The domain labelled "St?A" indicates an area of andalusite schists that resemble in appearance staurolite+andalusite-bearing schists to the NE and SW but in which staurolite has not been observed (see text). The data sources for the mineral assemblages and metamorphic zones/isograds used to build the map are as follows: Ashworth (1975; 1976); Ashworth & Chinner (1978); Beddoe-Stephens (1990); Carty & Johnson (2015); Chinner (1980; Chinner & Heseltine (1979); Droop et al. (2003); Fettes (1970; 1971; 2013); Fettes et al. (1991); Fettes (unpubl. data); Gillen (1987); Gunn et al. (2015); Harte & Hudson (1979); Hudson (1975; 1980; 1987); Hudson & Hart (1985); Hudson & Johnson (2015); Johnson & Fischer (2015); Johnson & Kneller (1987a; 1987b; Leslie (1984; 1987a; 1987b); Mendum (1987; 2013a; 2013b); Munro (1986); Porteous (1973); Read (1923; 1952; 1955; 1960); Read & Farquhar (1956); Stephenson (2013); Stephenson et al. (2013); Treagus (2009); Treagus & Roberts (1981); Viete et al. (2010); British Geological Survey 1:50,000 Sheets 75E, 76W, 85E, 86E, 87W, 96W, 97.
Fig. S2. Plots of whole rock and mineral chemical parameters as a function of distance/grade across the Buchan block. The graphs portray data from the two most intensively-sampled transects: the Ythan River transect (Fyvie-Methlick-Tarves area) of the central SE Buchan sequence (Figs. 1b and 2); and the NW Buchan coastal sequence (Figs. 1b and Fig. 8). The two transects increase in grade outwards in opposite directions (east and west) from the central low-grade Bt±Chl domain (see Fig. 1b). Raw data in Supplementary Tables S2 to S11.
Figure S3. Thermodynamically calculated phase diagrams for the average composition of Buchan metapelites of this study, except for (d) which is for an average metagreywacke composition. The compositions are listed in Table S4. The method of calculation of the phase diagrams is provided in Supplementary Document S2. Numbered reactions are listed in the text. Mineral abbreviations from Kretz (1983). Metamorphic field gradients are drawn on the diagrams to satisfy the order of inferred reactions in the text. See text for explanation of the pale-coloured P-T box for the Barrovian domain. (a) Phase diagram calculated using thermodynamic dataset and a-X models "HP11 ds 6.2"; 2014 a-X models All assemblages +Bt+Qtz+Pl+Ilm+Mt, except where indicated by “-Qtz”, “-Bt”, “-Ilm”. H₂O present below wet solidus; H₂O absent above wet solidus. 

(b) Phase diagram calculated using thermodynamic dataset and a-X models "HP6.2", assuming all Fe as Fe²⁺ (see text for explanation and discussion). The complementary phase diagram calculated for the measured whole rock value of $X_{Fe^{3+}} = 0.15$ is provided in Fig. 16a.}

---

**Fig. S3a and S3b**

Average Buchan metapelite MnNCKFMASHT; Fe³⁺/FeTotal = 0.15  
HP98 ds 5.5; 2005 a-X models  
All assemblages +Bt+Qtz+Pl+Ilm+Mt, except where indicated by “-Qtz”, “-Bt”, “-Ilm”. H₂O present below wet solidus; H₂O absent above wet solidus.  

Average Buchan metapelite MnNCKFMASHT; Fe³⁺/FeTotal = 0.0  
HP11 ds 6.2; 2014 a-X models  
All assemblages +Bt+Qtz+Pl+Ilm+Mt, except where indicated by “-Qtz”, “-Bt”, “-Ilm”. H₂O present below wet solidus; H₂O absent above wet solidus.
Figure S3. Thermodynamically calculated phase diagrams for the average composition of Buchan pelites of this study, except for (d) which is for an average metagreywacke composition. The compositions are listed in Table S4. The method of calculation of the phase diagrams is provided in Supplementary Document S2. Numbered reactions are listed in the text. Mineral abbreviations from Kretz (1983). Metamorphic field gradients are drawn on the diagrams to satisfy the order of inferred reactions in the text. See text for explanation of the pale-coloured P-T box for the Barrovian domain. (c) Subsolidus phase diagram calculated using thermodynamic dataset and a-X models “SPaC14”, assuming all Fe as Fe⁺⁺ (see text for explanation and discussion). (d) Phase diagram for the average metagreywacke composition of Vielzeuf & Montel (1994), calculated using thermodynamic dataset and a-X models "HP6.2" and the measured whole rock value of X_{Fe³⁺} = 0.08.
Fig. S4a to f. Representative back-scattered electron images of textural setting of monazite in rocks from the Buchan domain

Figure S4. Back-scattered electron (BSE) images of the textural setting of monazite grains from the nine samples chosen for monazite U-Pb geochronology (isotopic results and interpreted ages provided in Table S13). “Mnz14” etc. refers to the grain number in Table S13. In addition to the minerals labelled, all rocks contain quartz and plagioclase (darker grey colours in the BSE images). Mineral abbreviations from Kretz (1983). Images S4a to f are for the six samples from the Buchan domain; images S4g to k are for the three coastal samples from the Barrovian domain west of Portsoy.
Fig. S4g to k. Representative back-scattered electron images of textural setting of monazite in Barrovian rocks of the northwest Buchan coastal section.

Figure S4. Back-scattered electron (BSE) images of the textural setting of monazite grains from the nine samples chosen for monazite U-Pb geochronology (isotopic results and interpreted ages provided in Table S13). “Mnz14” etc. refers to the grain number in Table S13. In addition to the minerals labelled, all rocks contain quartz and plagioclase (darker grey colours in the BSE images). Mineral abbreviations from Kretz (1983). Images S4a to f are for the six samples from the Buchan domain; images S4g to k are for the three coastal samples from the Barrovian domain west of Portsoy.
Fig. S5. Results of monazite U-Pb geochronology plotted on Tera–Wasserburg U–Pb concordia diagrams (Tera & Wasserberg, 1972; Ludwig, 2003). Raw data for these plots are presented in Table S13, and analytical methods are provided in Supplementary Document S1. The samples are located in Figs. 1b, 2 and 4. Concordia intercept ages are anchored to an assumed common Pb value of 0.835 ± 0.06. Uncertainty ellipses are 2-sigma. MSWD – Mean Square of Weighted Deviates. Figures S5a to f are for the six samples analysed from the Buchan domain.
Fig. S5g to l. Monazite U-Pb results for combined samples from the Buchan domain, and for coastal samples from the Barrovian domain west of Portsoy, plotted on Tera-Wasserberg concordia diagrams.