

Figure 1. (a) *En echelon*, large-scale, elongated depressions offshore of Virginia and North Carolina between the Norfolk Canyon and the Albemarle-Currituck slide. Bathymetry is from the NOAA 3 arc-sec grid. The shelf edge depressions are interpreted as “gas blowout” features and will hereinafter be referred to as such. (b) Location map. (c) Enlargement of gas blowout features. Individual blowouts are labeled A-D. Red arrows indicate the smaller, more circular blowout features. (d) Location of Figure 2.

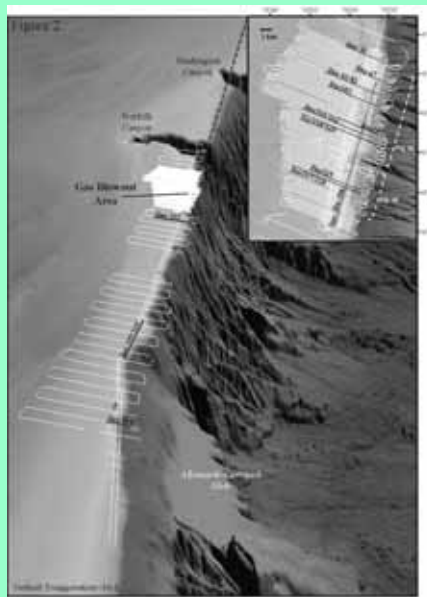


Figure 2. Survey ship track coverage superposed on NOAA 3 arc-sec gridded bathymetry in three-dimensional perspective view. Profile line numbers shown in Figures 3, 4, and 7 are labeled. See Figure 1 for location.

Large-scale elongated gas blowouts along the U.S. Atlantic margin

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 JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 109, 2004

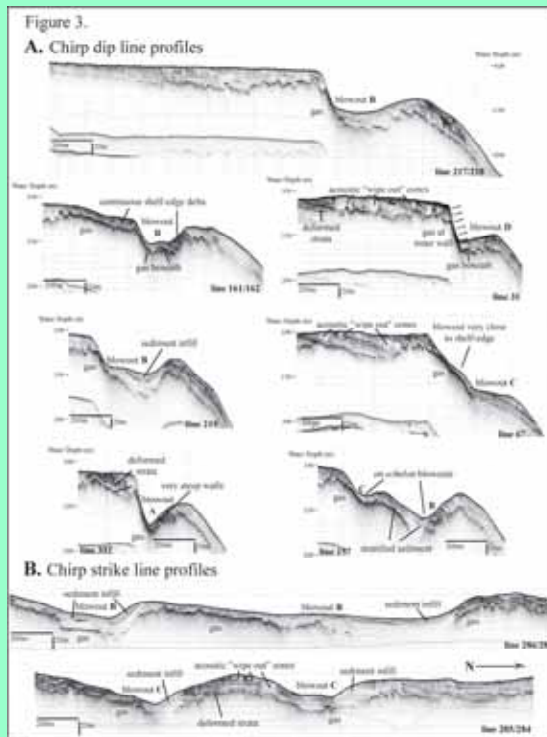


Figure 3. (a) Dip chirp subbottom profiles. (See Figure 2 for location.) The depressions have steep landward walls with high-backscatter gas prominent at the face of this wall. The internally deformed wedge of stratified sediment perched at the shelf edge has been locally removed by the gas blowout processes. Stratified sediment is also locally disturbed by gas “wipeout” zones. (b) Strike chirp subbottom profile. (See Figure 2 for location.) Strike line profiles show characteristics similar to the dip line profiles, including high-backscatter gas, internally deformed, stratified sediment, and gas wipeout zones. Additionally, small prograding clinoforms are shown in the sediment infill along the northern walls of the blowout depressions.

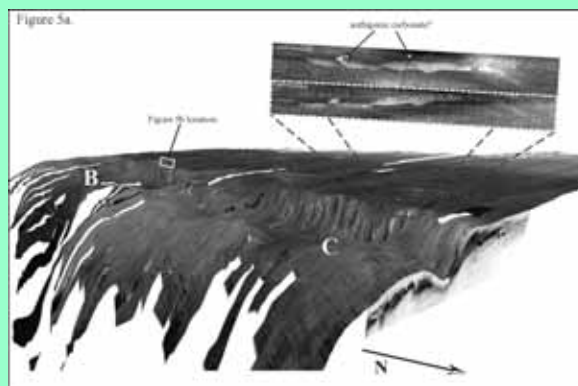


Figure 5. (a) Dip line side-scan mosaic draped over the NOAA 3 arc-sec bathymetric grid, showing location of the strike images above. The chirp subbottom profile on the right has been coregistered with the dip line mosaic. Blowouts B and C are labeled (see Figure 1). Figure 5a inset shows the following backscatter images from the strike line mosaics: (top) west looking and (bottom) east looking from the inner wall of blowout C in the vicinity of chirp profile 81/82 (Figure 4b). West (shallower water) is at the top. Lighter shades correspond to higher backscatter. Low-stand delta bedding outcrop along the blowout inner wall is clearly imaged. The slightly lobate high-backscatter zone appears to obscure the outcropping bedding on the downslope side. This relation is consistent with precipitation of carbonate crusts from continued gas-rich discharge after formation of the blowouts.

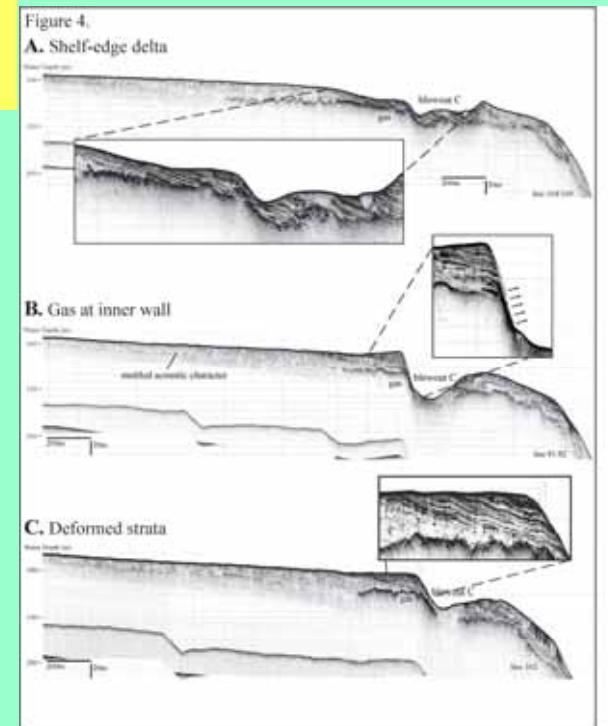


Figure 4. (a) Stratified sediment wedge interpreted as a shelf edge delta, continuous across the blowout area. (b) Highly reflective gas at the steep, landward wall of the blowout, showing possible evidence of continued gas-charged fluid seepage. (c) Internal deformation of the stratified sediment as a result of downslope creep

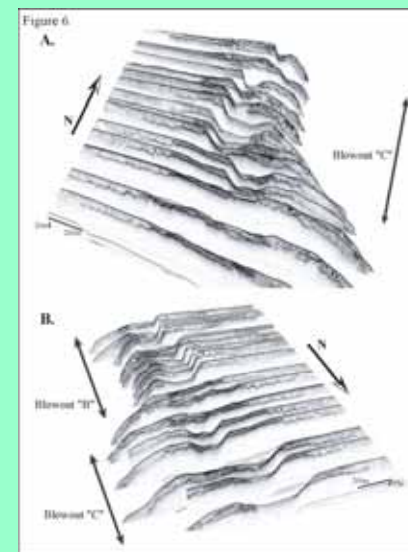


Figure 6. (a and b) Chirp subbottom profiles coregistered with bathymetry and displayed in a three-dimensional perspective. The blowout features display a distinct *en echelon* pattern. A strong correlation between trapped gas and the shelf edge delta is apparent throughout the region. The deformed strata are difficult to trace laterally between profiles, and the deformation and gas make it difficult to observe the character of the deeper stratigraphy along the margin.