ID: W2085519620

TITLE: Current perspectives on gas hydrate resources

AUTHOR: ['Ray Boswell', 'Timothy S. Collett']

ABSTRACT:

For the past three decades, discussion of naturally-occurring gas hydrates has been framed by a series of assessments that indicate enormous global volumes of methane present within gas hydrate accumulations. At present, these estimates continue to range over several orders of magnitude, creating great uncertainty in assessing those two gas hydrate issues that relate most directly to resource volumes ? gas hydrate?s potential as an energy resource and its possible role in ongoing climate change. However, a series of recent field expeditions have provided new insights into the nature of gas hydrate occurrence; perhaps most notably, the understanding that gas hydrates occur in a wide variety of geologic settings and modes of occurrence. These fundamental differences - which include gas hydrate concentration, host lithology, distribution within the sediment matrix, burial depth, water depth, and many others - can now be incorporated into evaluations of gas hydrate energy resource and environmental issues. With regard to energy supply potential, field data combined with advanced numerical simulation have identified gas-hydrate-bearing sands as the most feasible initial targets for energy recovery. The first assessments of potential technically-recoverable resources are now occurring, enabling a preliminary estimate of ultimate global recoverable volumes on the order of ~3 × 1014 m3 (1016 ft3; ?150 GtC). Other occurrences, such as gas hydrate-filled fractures in clay-dominated reservoirs, may also become potential energy production targets in the future; but as yet, no production concept has been demonstrated. With regard to the climate implications of gas hydrate, an analogous partitioning of global resources to determine that portion most prone to dissociation during specific future warming scenarios is needed. At present, it appears that these two portions of total gas hydrate resources (those that are the most likely targets for gas extraction and those that are the most likely to respond in a meaningful way to climate change) will be largely exclusive, as those deposits that are the most amenable to production (the more deeply buried and localized accumulations) are also those that are the most poorly coupled to oceanic and atmospheric conditions.

SOURCE: Energy & environmental science

PDF URL: None

CITED BY COUNT: 1169

PUBLICATION YEAR: 2011

TYPE: article

CONCEPTS: ['Clathrate hydrate', 'Hydrate', 'Petroleum engineering', 'Resource (disambiguation)', 'Lithology', 'Methane', 'Geology', 'Environmental science', 'Petrology', 'Computer science', 'Chemistry', 'Organic chemistry', 'Computer network']