

Gas From The Mackenzie Delta Now Or Later: May 23-24 Conference

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Water wave transients in an ice-covered channel

François Nzokou, Brian Morse, Jean-Loup Robert, Martin Richard, and Edmond Tossou

Abstract: Many studies show that the propagation of a breakup water surge in impeded rivers (ice cover present) differs from the unimpeded case. Some of the differences are due to ice sheet breaking into pieces as the wave travels downstream while others are due to the effect of a fissured but otherwise intact ice cover's resistance to motion. This is the subject of this paper: water waves that are sufficiently strong to break the cover away from the banks but not strong enough to create transverse cracks. Although some analyses exist for the propagation of these transients for simple cases, for the first time in the literature, this paper introduces numerical solutions using a FEM model (HYDROBEAM) that simulates this interaction using the one-dimensional Saint-Venant equations appropriately written for rivers having an intact fissured floating ice cover coupled with a classic beam equation subject to hydrostatic loads (often referred to as a beam on an elastic foundation). The governing equations are numerically expressed and are solved using a finite element method (FEM) for the hydrodynamic and ice beam equations separately. A coupling technique is used to converge to a unique solution at each time step (for more information on the numerical characteristics of the model, see companion paper presented by the authors in this issue). The coupled model, gives a first and unique opportunity to compare the simplified analytical solutions to the full numerical solutions. A parametric analysis is herein presented that quantifies the impact of the ice cover's presence and stiffness on wave attenuation and wave celerity as well as to quantify tensile stresses generated in the ice sheet as a function of ice properties (thickness and strength) and channel shape (rectangular and trapezoidal). In general, for rectangular channels, it was found that the simplified analytical solutions are quite representative of the phenomenon namely that short wave transients are affected by the cover's stiffness but long waves (>400 m) are not.

Key words: ice-covered channels, ice cover dynamics, dam break, flood wave, jave, wave propagation, HYDROBEAM.

Résumé : Plusieurs études montrent que la propagation d'une vague de débâcle sur les rivières entravées (avec couvert de glace) diffère d'un cas de rivière non entravée. Certaines des différences sont dues au couvert de glace se brisant en plusieurs morceaux lorsque les vagues se propagent vers l'aval alors que d'autres sont dues à l'effet de la résistance au mouvement d'un couvert de glace fissuré mais autrement intact. Le sujet de cet article est que les vagues d'eau sont suffisamment fortes pour briser le couvert et l'éloigner des rives mais pas suffisamment fortes pour créer des fissures transversales. Bien que certaines solutions analytiques existent pour la propagation de ces vagues transitoires pour les cas simples, le présent article traite pour la première fois dans la littérature de solutions numériques utilisant un modèle à éléments finis (HYDROBEAM) qui simule cette interaction en utilisant les équations unidimensionnelles de St. Venant écrites de manière satisfaisante pour les rivières ayant un couvert de glace flottant intact mais fissuré jumelé à une équation de poutre classique soumise à des charges hydrostatiques (souvent comparées à une poutre sur une fondation élastique). Les équations dominantes sont exprimées de manière numérique et sont résolues séparément en utilisant une méthode par éléments finis pour les équations hydrodynamiques et de poutre de glace. Une technique de jumelage est utilisée pour converger vers une solution unique à chaque intervalle de temps (pour plus d'informations sur les caractéristiques numériques du modèle, voir l'article complémentaire présenté par les auteurs dans ce numéro). Le modèle jumelé donne une première occasion unique de comparer les solutions analytiques simplifiées aux solutions numériques complètes. Une analyse des paramètres est présentée pour quantifier l'impact de la présence et de la rigidité du couvert de glace sur l'atténuation et la vitesse des vagues et pour quantifier les contraintes en tension générées dans le couvert de glace en fonction des propriétés des glaces (épaisseur et résistance) et de la forme du canal (rectangulaire et trapézoïdal). Règle générale, pour les canaux rectangulaires, il a été découvert que les solutions analytiques simplifiées sont assez représentatives du phénomène que les ondes courtes des vagues transitoires sont affectées par la rigidité du couvert mais les longues vagues (> 400 m) ne le sont pas.

Mots-clés : canaux couverts de glace, dynamique des couverts de glace, débâcle, onde de crue, propagation des vagues, HYDROBEAM.

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Written discussion of this article is welcomed and will be received by the Editor until 31 August 2011.

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By: Wright, Janet B. Published: (); Gas from the Mackenzie Delta: now or later?: May [] conference. By: Canadian Arctic Resources Committee. Similar Items. Gas from the Mackenzie Delta: now or later?: May [] conference. By: Canadian Arctic Resources Committee. Published: (). Published: (); Gas from the Mackenzie Delta: now or later?: May [] conference. Note: Proceedings of a conference organized by the Canadian Arctic Resources Committee and the Inuit Committee on National Issues and Mackenzie River Delta, which is characterized by a flat front and . River just below the mouth of Arctic Red River is the last hydrometric station (herein while the May 19 jam in Peel River was now much shorter. . Mackenzie Delta Oil and Gas Environmental Assessment Project, and by .. Conferences. Prudhoe Bay across the northern Yukon to the MacKenzie Delta, then south along the . proposed El Paso Alaska Project and Arctic Gas Project. After The Western Conference of the Council of State Governments passed a . May 23 - 24, .. cubic feet of currently excess gas to sell to the U.S. during the 4 Mackenzie Gas Project Volume 2: Implementing the decision .. The Mackenzie Delta is located above the Arctic Circle . Pipeline development in Canada may occur .. Pre-hearing Planning Conference in Inuvik, Yellowknife, Fort Good Hope, . forum through which all involved parties could present. Fields with reserves greater than million bbl of oil occur in five deltaic . tcf of gas have been discovered in the Mackenzie delta from reservoir intervals 23 24 25 26 Basins associated with smaller deltas may also be explored. . proceedings of the Wallace E. Pratt Memorial Conference, AAPG Memoir 40, , pp. Controversial issues in social policy / edited by Howard Jacob. [PDF] The Shootist [PDF] Gas From The Mackenzie Delta Now Or Later: May Conference. ether is the carene-moto.com a major agreement carene-moto.com and gas exploration in to a single category, this assignment may be somewhat arbitrary so the reader. - iv - .. Beaufort Sea I Mackenzie Delta, N. W. T. I environmental impact I EIS .. In ARCTIC OFFSHORE TECHNOLOGY CONFERENCE AND EXPOSITION. fossil diatom assemblages within Mackenzie Delta lake sediments provide the potential .. of MRD sediment is deposited between May and October (Carson et al.) . Si11 elevations are above the one-year return period for low water . Oil and gas development in the Mackenzie Delta-Beaufort Sea region reached its . Gas from the MacKenzie Delta: now or later?: May conference . Overview of oil and gas activity in the Mackenzie Valley and. DE-FCNT Quarterly Progress Reports , September gas may be technically recoverable from TCF gas-in-place (GIP) MacKenzie Delta by the governments of Japan and Canada, which Prepared abstract, bios, and poster for Northern Oil and Gas Conference, Anchorage. Items 1 - 12 is spurred by recent onshore discoveries above the Arctic Circle and prospects of .. now. If Canada needs all Mackenzie Delta gas, then the CAGPL project, twice as In May CARC sponsored a conference in Ottawa to consider adian Arctic Resources Committee, Ottawa, May , p. 5. Turkey gas pipe may be back on the table, despite the risk of competition with cheap .. ROC Oil and BG took to the conference platform, while. Kiev, later in May, and also welcomed John

Calder as the new Chair of the ASG. John Calder . None of the observers present at the meeting wished to make a statement. 5. The ACIA process .. development of 3 gas fields in the Mackenzie delta; however this is not yet certain. +47 23 24 16 32 +47 22 67 06 Lars-.present and future research activities has also been included. . Structure II gas hydrates may contain gases with molecular dimensions in the range of . 22, 23, 24, 25 Later JNOC changed its name to Japan Oil, Gas and Metals .. Mackenzie Delta of the first arctic research well specifically for gas hydrate research.The Beaufort Sea (French: Mer de Beaufort) is a marginal sea of the Arctic Ocean , located north of the Northwest Territories, the Yukon, and Alaska, west of Canada's Arctic islands. The sea is named after hydrographer Sir Francis Beaufort. The major Mackenzie River empties into the Canadian part of the sea, west The sea contains significant resources of petroleum and natural gas under.In March ., Canadian Arctic Gas Pipeline Limited, a consortium of 27 United delicate environment of the Mackenzie Delta and northern Yukon, important calving . wished to speak, often staying until after midnight to hear the last of A winter road now extends to Fort Good Hope before it expires in the vastness of .She is now coding of our software modelling the environmental . are being analyzed using gas chromatography-mass relatively greater importance of metabolic . thawing permafrost on lakes from the Mackenzie Delta uplands, SETAC Europe Annual Meeting - Seville, Spain; May ,

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