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Évaluation de la probabilité d'atteinte d'éboulement

1. Localisation des zones de départ

La compréhension des phénomènes de rupture qui déterminent l'amorce des phénomènes d'éboulement est importante pour reconnaître les zones de départ et le volume potentiel des blocs. Les travaux listés ci-après utilisent les principes de la géomécanique par le biais de méthodes rapides permettant de définir les cinématismes possibles, méthodes d'analyse de la stabilité, méthodes d'analyse de l'image à distance. Les travaux qui présentent des aspects applicables sont indiqués avec un (A).

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Valutazione della pericolosità da crollo

1. Localizzazione delle aree di origine

La comprensione dei fenomeni di rottura che determinano l'innesco dei fenomeni di crollo è importante per il riconoscimento delle aree sorgente e del volume potenziale dei blocchi. I lavori elencati di seguito utilizzano principi propri della geomeccanica tramite i metodi speditivi per definire i possibili cinematismi, metodi di analisi di stabilità, metodi di analisi di immagine a distanza. I lavori che presentano aspetti applicativi sono indicati con (A).

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2. Prévision temporelle

L'étude de la distribution dans le temps des phénomènes d'éboulement se base sur l'analyse des séries d'événements qui se sont vérifiés au fil du temps surtout pour les éboulements de petites dimensions et à fréquence élevée. Ci-dessous, sont listés les travaux qui utilisent ce type d'approche à l'analyse des éboulements. Ces études prennent en considération divers paramètres tels que le volume et la forme des blocs, la période de l'année où ils se produisent, les conditions morpho-climatiques de la zone étudiée, etc. Les travaux qui présentent des aspects applicables sont indiqués avec un (A).

2. Previsione temporale

Lo studio della distribuzione nel tempo dei fenomeni di crollo si basa sull'analisi di serie temporali di eventi passati, soprattutto per i crolli di piccole dimensioni ed elevata frequenza. Di seguito sono elencati lavori che utilizzano questo tipo di approccio all'analisi dei crolli. Questi studi prendono in considerazione vari parametri quali volume e forma dei blocchi, periodo dell'anno nel quale si verificano, condizioni morfo-climatiche dell'area in esame, ecc. I lavori che presentano aspetti applicativi sono indicati con (A).

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3. Propagation et distance d'atteinte

Les travaux ci-dessous listés se réfèrent à la simulation du phénomène d'éboulement à l'aide de codes numériques basés sur les lois physiques qui gouverne le mouvement des blocs. Les modèles mathématiques et les codes de calcul décrits dans ces travaux ont pour but de déterminer les distances maximums d'atteinte auxquelles ces phénomènes peuvent parvenir, les vitesses et les énergies enregistrées par les blocs. Certains de ces travaux décrivent des expériences de terrain et/ou traitent du projet et de la construction d'ouvrages de protection. Les travaux qui présentent des aspects applicables sont indiqués avec un (A).

3. Propagazione e distanza raggiungibile

I lavori di seguito elencati trattano della simulazione del fenomeno di crollo mediante codici numerici basati sulle leggi fisiche che governano il moto dei blocchi. I modelli matematici ed i codici di calcolo descritti in questi lavori hanno come obiettivo la definizione delle massime distanze raggiungibili dai crolli e delle velocità ed energie raggiunte dai blocchi. Alcuni di questi lavori descrivono esperimenti di terreno e/o trattano della progettazione e costruzione di opere di difesa. I lavori che presentano aspetti applicativi sono indicati con (A).

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4. Éboulements en masse

Les travaux listés ci-dessous présentent des classifications et des descriptions des éboulements en masse dans les diverses phases d'évolution de ce phénomène engendré par des éboulements ou des glissements dièdres ou en bloc pour évoluer vers un mécanisme complexe (*flowslide* de Colin Rouse,1984) avec une grosse composante de flux (Heim, 1988,1932; HSU 1975) et à énergie élevée. La mobilité de ces éboulements (entendue comme distance d'atteinte) augmente avec le volume de matériel impliqué (Heim 1932, Shreve 1968; Scheidegger, 1973, Abele 1974, HSU 1975, Eisbache, 1979, Davies 1982), c'est à dire que dans le volume il existe un seuil quelconque au delà du-

4. Valanghe di roccia

I lavori di seguito elencati presentano classificazioni e descrizioni delle valanghe di roccia, nelle diverse fasi di evoluzione di questo fenomeno che prende origine da fenomeni quali crolli o scivolamenti traslazionali a cuneo o a blocco, per poi evolversi in un meccanismo complesso ("flowslide" da Colin Rouse, 1984) con una grossa componente di flusso (Heim, 1988, 1932; Hsu, 1975) e ad elevata energia. La mobilità di queste frane (intesa come distanza raggiunta) aumenta con il volume di materiale coinvolto (Heim, 1932; Shreve, 1968; Scheidegger, 1973; Abele, 1974; Hsu, 1975; Eisbacher, 1979; Davies, 1982), esiste cioè una qualche soglia in volume al di sopra della quale il

quel le roulement libre des blocs, caractéristique des phénomènes d'éboulement, se transforme en flux cohérent d'une masse rocheuse désagrégée. Ce seuil en volume varie d'environ 0.1 à 1 M m^3 en fonction de la lithologie et de la géométrie du parcours (Eisbacher & Clague, 1984). En général, les accumulations peuvent être distribuées sur des longueurs de plusieurs kilomètres et peuvent remonter des dénivelés de plusieurs centaines de mètres. Les travaux qui présentent des aspects applicables sont indiqués avec un (A).

rotolamento libero di singoli blocchi, caratteristico dei fenomeni di crollo, si trasforma in flusso coerente di una massa rocciosa disgregata. Questa soglia in volume è variabile da circa 0.1 a 1 M m^3, dipendentemente dalla litologia e dalla geometria del percorso (Eisbacher & Clague, 1984). In generale gli accumuli si possono distribuire su lunghezze anche di chilometri e possono risalire dislivelli anche di diverse centinaia di metri. I lavori che presentano aspetti applicativi sono indicati con (A).

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5. Évaluation de la probabilité d'atteinte et du risque

Les travaux listés ci-dessous proposent des méthodologies semi-quantitatives pour évaluer la probabilité d'atteinte et le risque d'éboulement en général ou en particulier pour les écroulements rocheux. Ces travaux prennent en considération et combinent entre eux des paramètres relatifs à la morphologie du versant, à la lithologie, à la distribution des phénomènes antérieurs, aux caractéristiques géomécaniques de l'amas rocheux etc.. Les travaux qui présentent des aspects applicables sont indiqués avec un (A).

5. Valutazione della pericolosità e del rischio

I lavori di seguito elencati propongono metodologie semi quantitative per la valutazione della pericolosità e del rischio da frana in generale o in particolare per i crolli. Questi lavori prendono in considerazione e combinano fra loro parametri relativi alla morfologia del versante, alla litologia, alla distribuzione di fenomeni pregressi, alle caratteristiche geomeccaniche dell'ammasso roccioso, ecc. I lavori che presentano aspetti applicativi sono indicati con (A).

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6. Évaluation de la probabilité d'atteinte et du risque au moyen du GIS

Les travaux listés ci-dessous développent des méthodologies pour le zonage du territoire en fonction de la probabilité d'atteinte et du risque d'éboulement en utilisant le Geographical Information System (GIS) et des analyses territoriales statistiques de type varié.

6. Valutazione della pericolosità e del rischio tramite GIS

I lavori di seguito elencati sviluppano metodologie per la zonazione del territorio in base alla pericolosità e al rischio da frana utilizzando Geographical Information Systems (GIS) e analisi statistiche territoriali di vario tipo.

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