

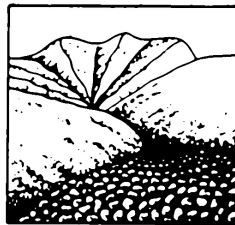


Proceedings of the International Conference

# **DEBRIS FLOWS: Disasters, Risk, Forecast, Protection**

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Pyatigorsk, Russia, 22-29 September 2008



Edited by  
S.S. Chernomorets

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Sevkavgirovodkhoz Institute  
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## Гидрометеорологические условия периодов массового селеобразования на о. Сахалин

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## Hydrometeorological conditions of the periods of mass debris-flow occurrence on Sakhalin Island

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JZkkfZljbZ\_lky ֆbygb\_ fZdkbfZevguo agZq\_gbc փiZֆbo ԹԹbo hkZճh\ gZ  
ijhp\_kk nhjfbjhZgby i\_jbhֆ\ fZkkhֆ]h k\_e\_h]jZahZgby gZhk]h\ KZoZebg

We examine the influence of the maximum values of liquid precipitation on the process of the formation of periods of mass debris-flows occurrence on Sakhalin Island.

### 1 Введение

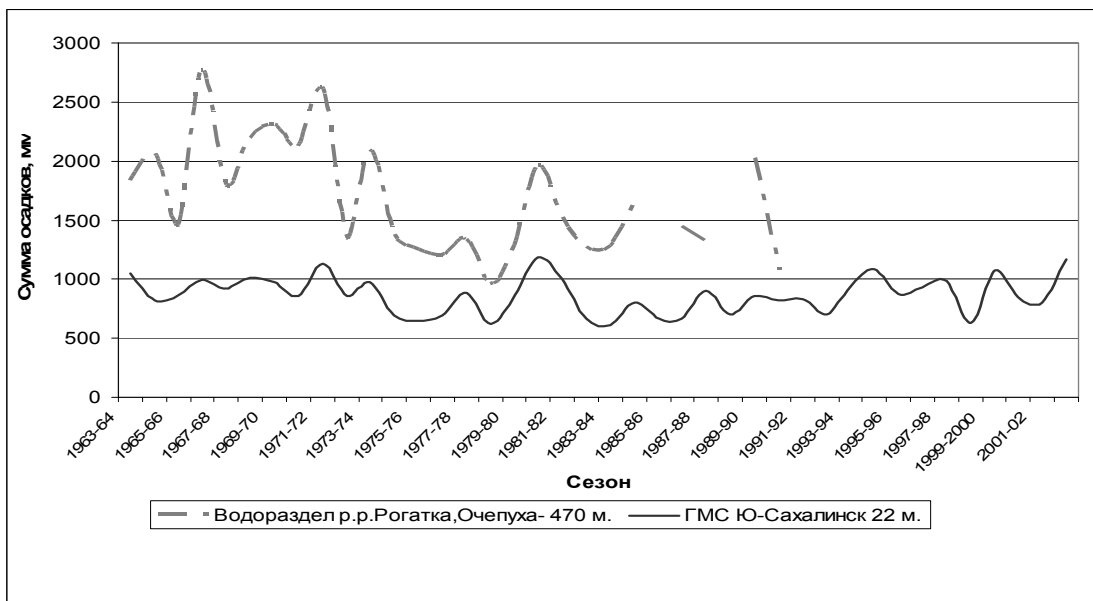
Ձ Երբ Ի nZdlhjhf , hij\_ֆeyxsf bgl\_gkbghklv jZaֆlby k\_e\_ֆo ijhp\_k-  
kh\ \ gbadh]hjv\_ h. KZoZebgZ\_yֆy\_lky dhebq\_klֆ b bgl\_gkbghklv hkZճh\ փiZZx -  
sbo gZl\_jjblhjbb . <hijhkm ֆbygby ԹԹbo hkZճh\ gZnhjfbjhZgby\_ k\_e\_c\ gbadh-  
]hjv\_ KZoZebgZ\_ֆue ihkys\_g jy^ jZ[h] (mZjbgZ b ֆ ., 1987; I\_jh\ , 1989; DZaZdh\b  
ֆԹdhZ, 1988, 1990). HgZdh , fu ijb^jֆZ\_fky ֆleyZ , hljZ\_ggh]h \ jZ[h]Zo (DZ  
aZdh\b Fbg\_jֆg, 2000; DZaZdh\ b =\_gkbhjhkֆdbc , 2007), ]^ ]bֆhf\_l\_h jheh]bq\_kdb\_  
nZdlhju k\_e\_h]jZahZgby jZkkfZljbZֆx]ky dZd ihֆbg\_ggu\_ , Z ]eZ\gklm\_xsmx jhev  
b]jZxl nZdlhju ]\_heh]bq\_kdb\_.

### 2 Рассмотрение проблемы

Իֆhknjֆg Ի hkZճb , փiZZ\_xsb\_ gZl\_jjblhjbb hkljhZ , yֆyx]ky j\_amevlZlhf  
Zdlbֆghc pbdehgbq\_kdhc ֆyl\_ֆvghklb. =hֆֆ\_ kmffu hkZճh\ \ ֆֆbsZo ֆebg b gZ  
fhjkdhf ih[\_j\_v\_ \ xֆguo jZchgZo dhe[\_ex]ky \ ij\_ֆeZo 800-1100 ff ( \ ]hjZo  
kj\_ֆb\_ agZq\_gbykmff փiZֆbo hkZճh\ \ aֆֆkֆbֆhklb hl ֆklh]ghc ahgu khklZֆyx]l  
1500-2000 ff b \ hl\_ֆevgu\_ ]hֆ fh]ml ij\_ֆrZlv 3000 ff). Wlh ohj\_hrh ֆֆgh gZ  
kjZֆbl\_ֆvghf ]jZnb\_d\_fgh]he\_lg\_]h ohZ hkZճh\ , ijb^\_ֆggh]h gZjbc . 1.

< l\_ֆeuc i\_jbh^ փiZZ\_l 65-80% ]hֆֆc ghjfu . Kmffu hkZճh\ ih Zgguf  
]bֆhf\_l\_hjheh]bq\_kdbc klZgpbc (=FK) \ ihl\_gpbZevgh k\_e\_hiZkguc i\_jbh^ (bxgv -  
hdly[jv) \ kj\_ֆ\_f khklZֆyx]l 300-600 ff, \ fZdkbfmf\_ ֆklb]Zy 1100 ff . GZֆ hlf\_ -  
lblv ke\_fnx\_ , qlh ihZֆyx]Zy qZklv gZ[exZl\_ֆvghc k\_lb ]hk]bֆhf\_lZ jZkiheh -  
\_g Zֆev ih[\_j\_bc, eb[h \ ֆֆbsZo j\_qguo ֆebg hkljhZ . < lZ[ebp\_l ijbֆֆlky  
ijhp\_g]gh\_ khhlghr\_gb\_ jZkij\_ֆe\_gby =FK b ]bֆheh]bq\_kdbo ihklh\ (=I) ih ֆkh -  
lZf gZl\_jjblhjbb hkljhZ (=gkbhjhkֆdbc b DZaZdh\ 2007).

< mkehֆyo dh]Z , 3/4 l\_jjblhjbb aZgy]h ]hjZfb , k Z[khex]gufb hlf\_l\_dZfb 350-  
1600 f . bkihevahZgb\_ lhevdh Zgguo h[ hkZճZo, ihemq\_gguo gZ=FK , ijbֆֆl d\_g\_-  
ֆm q\_lm]iZjZf\_ljh\ ]bֆhf\_l\_hjheh]bq\_kdbo yֆ\_gbc , Zggu\_ bo gZ[ex^\_gbc g\_fh]ml  
bkihevahZlvky ֆy khklZֆ\_gby k\_e\_h]h ijh]ghaZ.



4. KjZgbl\_ evguc ljZnbd ohZ hkZdh\ ih ]b]hf\_l\_hjeh]bq\_kdhc klZgpbb Xgh - KZoZebgkdb kmffZjghfm hkZdhf\_jm , gZohb\ fmky gZ h]jZa^e\_ j\_d Jh]ZldZ b Hq\_imoZ\ hdj\_klghklyo ]. Xgh -KZoZebgkdZ.

LZ[ebpZ 1. Ijhp\_glgh\_ khhlghr\_gb\_ jZkiheh`gby =FK b=I ih \khlZf gZl\_jjblh]bb KZoZ ebGZ.

>bZiZahg \khl, Z[k. f .	% hl h[s_]h dhebq_klZ =FK b=I
0-50	77,7
50-100	9,6
100-200	11,7
>200	1

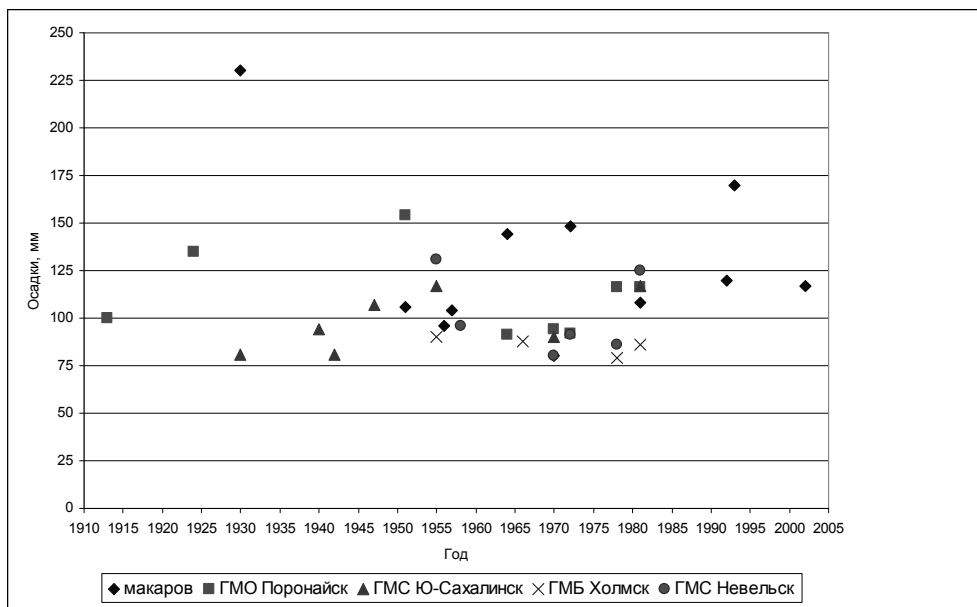
GZijbf\_j , lZdZy kblmZpbykehbeZkv \ jZchg\_ ]. FZdZjhZ \ i\_jbh^ fZkhh]h k\_e\_h[jZahZgby \ gZqZe\_k\_gly[jy 1992 ], ihkdhevdm =FK jZkiheh`gZ gZ fhjkdhc l\_jjZk\_ (Z[khexlgZy \khlZ 38 f ), \ ahg\_jZa]jmadb k\_e\_uo hleh`gbc , Zh]jZa^eu k\_e\_uo [Zkk\_cg\ gZoh]ky \ hlf\_ldZo 300-500 f , lh hkZdh , \iZrb\_ \ jZchg\_ klZgpbb agZqbl\_evgh hlebqZebkv hl hkZdh\ \iZrb\_ \ ijh]jZa^evghc qZklb [Zk\_k\_cg\ .

< dhgp\_ e\_lZb gZqZe\_hk\_gb gZ[exZxlky \ohu ]em[hdbo pbdegh\ b lZcnm-gh\ , ijbgkysbo ebG\_u\_ h]. AZkmldb haffgh \iZ^gb\_ 1-2 f\_kyqguo ghjf hkZdh\ . LZd\ ]. >hebkd \ k\_gly[j\_ 1947 ]. aZkmlb \iZeh 222 ff hkZdh\ , ijb f\_ kyqghc ghjf\_ 120 ff. FZdkbfZevgu\_ kmlhqug\_ dhebq\_klZ hkZdh\ hl h] ijb\^ - gu gZjbmgd\_ 2.

DZdbgh ba ijb\^ggh]h jbkmgdZ, kmlhqug\_ fZdkbfmfu hkZdh\ fh]ml ij\_u- rZlv 200 ff. K\_e\_h[jZamxsZy kmffZ hkZdh\ gZ hkljh\ KZoZebgij\_urZ\_l 50 ff ijb bgl\_gkbghklb hkZdh\ 30-50 ff /kmlb (DZaZdh\ b Fbg\_jbg , 2000). HgZdh , \ kemqZ\_ij\_f\_kl\mxs\_]h m]Zg\_gby ihjh^ \ k\_e\_hf fZkkb\ , k\_e\_u\_ ijhp\_kku jZa- bZxlky ijb \iZ^gbb 10-20 ff hkZdh\ \ l\_q\_gb\_ kmlhd

Kh]Z^ \_gb\_ kmlhqug\_ fZdkbfmfh\ hkZdh\ (ijb\^gu fZdkbfZevgu\_ kmlhqug\_ hkZdh hl h] ij\_urZsb\_ 70 ff ) ih g\_kdhevdbf klZgpbyf , hgh\_j\_ggh mdZau Z\_l i\_jbh^ fZkhh]h k\_e\_nh]fbjhZgby gZ [hevr\_c qZklb l\_jjblh]bb h. KZoZebg JZkfh]jbf gZb[he\_ ihdZaZl\_evgu\_ kemqZbfZkhh]h nh]fbjhZgby k\_e\_c.

>Zgu\_ i\_jbh^ , dZdijZbeh , hlf\_qZxlky kh ]hjhc iheh]gu bxey h k\_j\_ b - gu hdly[jy b kyaZgu k ijhoh` ^gb\_f ]em[hdbo pbdegh\ , kh]h]Zxsboky \iZ- ^gb\_f h[bevguo hkZdh\ ([he\_ 50 ff/ kmlb) ijb bo [hevrhc bgl\_gkbghklb . HgZdh g\_h[ohb]h h[yaZl\_evgh\_mkeh]\_ - gZdhie\_gb\_ \ k\_e\_uo hqZ]Zodjblbq\_kdh]h h[t\_fZ ihl\_gpbZevgh]h k\_e\_h]h fZkkbZ (IKF). Djblbq\_kdZy lhesbgZ IKF khklZey\_l 0,5-1,0 f (DZaZdh\ b Fbg\_jbg, 2000).



Jbk.2. Kmlhqugu\_fZdkbfmfu hkZdh\ hl hÿ ih =FK \ k\_e\_hiZkguo jZchgZo aZi\_jbh^ 1913-2003 ].].

Pbdehg , ijhr\_abc gZ^l\_jjblhjbc KZoZebgkdhch[eZklb 18-19.09.1970 hoZlbe [hevrmx l\_jjblhjbx hkljhZ . Kmlhqugu\_fZdkbfmfu hkZdh\ khklZbeb \ jZchgZo k\_e\_h[jZahZgby : =FK FZdZjh\ - 80 ff, =FK G\_\evkd - 80 ff, \ ]hjZo x]Z (kg\_]heZbggZy klZgpby I\_j\_Ze, Z[k. ukhlZ 300 f) aZ 12 qZkh\uiZeh 121 ff. <uiZ^gb\_ lZ-dh]h dhebq\_klZ hkZdh\ ijb\\_eh d fZkkihfm k\_e\_h[jZahZgby \ G\_\evkdhf, Ohef - kdhf, FZdZjhkdhf jZchgZo KZoZebgkdhc h[eZklb .

Ke\_fmxc jZkkfZljbZ\_fuc i\_jbh^ k\_gly[jv -hdly[jv 1972 ]hZ , dh]Z ijhoh^\_gb\_ jyZ pbdehg\ ijb\\_eh d uiZ^gbx agZqbl\_evgh]h dhebq\_klZ hkZdh\ , m\_eZg\_gbx l\_jjblhjbb b\_uaZeh fZkkihuc koh^ k\_e\_c \ ur\_gZaZgguo jZchgZo. Km lhqugu\_fZdkbfmfu hkZdh\ khklZbeb :=FK FZdZjh\ - 148 ff, =FK G\_\evkd - 91 ff, =FK Xgh- KZoZebgk - 68 ff ( aZ9 qZkh). < ]hjZo x]Z (kg\_]heZbggZy klZgpby I\_j\_ - Ze) aZ 12qZkh\uiZeh 121 ff.

?s\_hbg i\_jbh^ fZkkih]h nhjfbjhZgby k\_e\_c hoZlbrbc [hevrmx qZklv hkljhZ - Z]mkl 1978 ]hZ . Kmlhqugu\_fZdkbfmfu dhe\_[Zebkv hl 76 ff ( ]b]hf\_l\_hjh - eh]bq\_kdh\_ [xjh Ohefkd) h 116 ff ([b]hf\_l\_hjheh]bq\_kdZy h[k\_jZlhjby ]hjh - gZckd), \ ]hjZo hkljhZ bgl\_gkbgkklv hkZdh\ [ueZ\_s\_ ur\_ (kg\_]heZbggZy klZgpby I\_j\_Ze ) - 40 ff aZ 3 qZkZljb ij hoh^gbb lZcnmg\ «Hbg » b «Nbeebk» 2-7 Z]m-klZ 1981 ]. kmffZ hkZdh\ gZ=FK «Xgh -KZoZebgk (Z[k. ukhlZ 22 f) khklZbeZ 220 ff. AZlhl \_ i\_jbh^ \ KmkmgZckdhfoj\_[\_ ih Zgguf kmffZjguo hkZdhf\_jh\ \ bg-l\_jZe\_ Z[khexlguo hlf\_lhd hl 400 h 600 f kmffu hkZdh\ khklZbeb [he\_ 1200 ff.

<h k\_o ur\_i\_j\_qbke\_gguo i\_jbhZo k\_e\_h[jZahZgby , uiZrb\_ hkZdb h[m-keZebZeb Zdlbg\_h\_h[jZahZgb\_ k\_e\_uo ihlhdh\ .

Hgzdh g\_k]Z uiZ^gb\_ agZqbl\_evgh]h dhebq\_klZ hkZdh\ ijb]bl d fZk-kihfm kohm k\_e\_c. LZd,\ k\_gly[j\_ 1982 ]hZ , ijb ijhoh^gbb pbdehgZ kmlhgh\_dh-ebq\_klh hkZdh\ ih =FK FZdZjh\ khklZbeb 124 ff. JZkoh^ hu ih j.FZdZjhZ kh-klZbe 850 f^3/k, Zgguc jZkoh^ ih kh\_c \_ebqbg\_ , yey\_lky ]hjuf aZ\_kv i\_jbh^ gZ-[ex^gbc b mklmiZ\_l]hevhd dZlZkljhnq\_kdhfm jZkohm hu 1722 f^3/k (Z]mkl 1981 ]hZ ). Gh fZkkih]h k\_e\_nhjfbjhZgby \ jZchg\_hlf\_q\_gh\_g\_ [ueh . Wlh h[mkehgh\_l\_f , qlh ]h]f jZg\_ , ihke\_ ijhoh^gby lZcnmgZ«Nbeebk», khr\_fb\_ k\_e\_u\_ ihlh -db iheghklvx hqbk]beb k\_e\_u\_ hqZ]b hl ihl\_gpbZevguo k\_e\_uo fZkkih\ gZdhie\_-gby. Lh\_klv hlkmklhZeh h[yaZl\_evgh\_mkeh\_b\_kohZ k\_e\_c \ gbadh]hjv\_ h. KZoZebgZ -djblbq\_kdbc h[t\_f fZl\_jbZeZ \ k\_e\_uo hqZ]Zo



Jbk.3. K\_e\_ù\_ hleh`gby lhesbghc ñ 2,5 f ([Zkk\_cg j . Jh]ZldZ). Nhlh Ljmr : . . .

### 3 Заключение

1. Kmffu hkZdh\ \ P\_gljZevguo b Xguo jZchgZo KZoZebgZ\ ñebgZo b gZ fhjkdbo ih[\_v`yo ) \ ihl\_gpbZevgh k\_e\_hiZkguc i\_jbh^ (bxgv-hdly[jv ) \ kj\_g\_f khklZeyxl 300-600 ff, \ fZdkbfmf\_ ñklb]Zy 1100 ff. < ]hjguo qZklyo hkljhZ aZ ye\_gb\_ fh\_l `iZklv ( \ aZ`kbfhklb hl `khlh f\_klZ ) [he\_ 1200 ff hkZdh\ .

2. < ]hjZo hkljhZ bgl\_gkbghklv hkZdh\ fh\_l khklZeylv [he\_ 40 ff /q. Ijb ijhoh^gbb lZcnmgh\ jZagbpZ f\_ñ hkZdZfb , hlf\_qZ\_fufb aZye\_gb\_ \ ijb[j\_` -ghc, ñebgghc qZklyo hkljhZ b hkZdZfb \ ]hjZo fh\_l khklZeylv 1000 ff, aZye\_gb\_ -gb\_.

3. K\_e\_hljZamxsZy kmffZ hkZdh\ gZhkljh\ KZoZebgij\_ürZ\_l 50 ff ijb bg-l\_gkbghklb hkZdh\ 20-50 ff/ kmldb.

4. >ey fZkhh]h k\_e\_nhjfjhZgby g\_h[oh`fh gZdhie\_gb\_ \ k\_e\_ùo hqZ]Zo djblbq\_kdh]h h[t\_fZ ihl\_gpbZevgh]h k\_e\_h]h fZkbbZ lhesbghc 0,5-1,0 f .

### Список литературы

- m`gZ H.B., I\_jh\ <.N., KbñjhZ L.E. K\_e\_ù\_ ye\_gby h. KZoZebg - <\_klgbd Fhkdhkdh]h mg]Z, k\_j. 5, ]\_hljZnby , < 3, 1987, k. 76-81.
- =\_gkbhjhkdbc X.<., DZaZdh\G.: . G\_ñmq\_l hkZdh\ \ gbadh]hvj\_ h. KZoZebgZdZd ijbqbgZ aZgb\_gby jZkq\_lguo iZjZf\_ljh\ khhj\_m`gbc ijb ijh\_dlbjhZgbb b kljhbl\_evkl\ . - =\_h-jbkd , < 1, 2007, k. 58-60.
- DZaZdh\G.: ., =\_gkbhjhkdbc X.<. DZlZkljhnbq\_kdb\_ k\_e\_ù\_ ihlhdh \ gbadh]hvj\_ h. KZoZebgZ b bo hiZkghklv éy fZ]bkljZevguo ljm[hijhñ\ (gZ ijb\_f\_j\_ «KZoZebg-2»). - Ijh[e\_fu ijh]ghabhZgby qj\_a`qZcguo kblmZpbc. K[hjgbd fZl\_jbZeh\ VII gZmqghijZdlbq\_kdhc dhgn\_j\_gpbb . FhkZ: « :glkloby », 2007, k. 34-35.
- DZaZdh\G.: ., @dhZ AB. JZchgbjhZgb\_ h. KZoZebgih kl\_i\_gb ijhye\_gby k\_e\_ùc ^yl\_ev\_gkklb. - Ljm` =b]hf\_lp\_gljZ KZoZebgkdh]h M=FK. J\_]bhgZevgu\_ bkke\_ñZgby . Xgh - KZoZebgkd, 1988, k. 131-137.
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- DZaZdh\G.: ., Fbg\_jbg B.=. K\_e\_ù\_ ijhp\_kku gZh. KZoZebg - IjbdeZ`Zy ]\_hwdheh]by, qj\_a`qZcgu\_ kblmZpbbb a\_f\_evguo dZZklj . <ui. 4, Fh kdZ : Ihel\_dk , 2000, k. 35-38.
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