

**CONSTRAINTS ON THE SHALLOW MAGMATIC SYSTEM
IN THE SOUTHERN PART OF KLYUCHEVSKOY VOLCANIC GROUP
FROM SIEMIC DATA**

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Uqwj gtp'r ctv'qh'vj g'Mn{ wej gxunq { "xqrepcle"i tqwr "MXI +eqo r tkgu"vy q'r cktu"qh"utcvqxqrepcqgu"
*Qut { "Vqrdcej kni("Rrquf "Vqrdcej kni'cpf "Dqni c { c"WF lpg("O cr { c"WF lpc+"cpf "Vqrdcej kni'ctgcn'xqrepcle"
hgrf O'W lpu "xqrepcqgu"eqgzku" y kj "ugxgten" { qwpi gt "gzvtwukpu' Qh'vj gug" qpgu" qpn "Rrquf "Vqrdcej kni'
xqrepcq" cpf "uqwj gtp'r ctv'qh'vj g"Vqrdcej kni'ctgcn'xqrepcle" hgrf "Vqrdcej kpuif "F qn "VF +"ctg"cevxxg"cv'vj g"
r tgu'p'v'ko gO'K'ku"cuwo gf "vj cv'utcvqxqrepcqgu'ctg"mcevgf "lp" c"ukpi ng"GUG/Y P Y " | qpg'qh'f ggr "hcvwu'Vj g"
ekpf gt"eqpgu"cpf "rxc"lmy "gtw vxxg"egpvtu"qh'VF "ctg"eqpegpvcvgf "cmppi "vj g"~62"no "hcvwu'qtkepvf "UUY /
P P GO'Rrquf "Vqrdcej kni'xqrepcq" j cu"muv"ku"lpf gr gpf gpv'cevxxk { "lp"vj g"dgi kppki "qh'J qmeggp"cpf "y cu"
ecr wtgf "d { "Vqrdcej kni'ctgcn'xqrepcle" hgrf O'Uq'pqy "k'ecp"dg"eqpukf gtgf "cu'qpg'qh'vj g"gtw vxxg"egpvtu"qh'vj g"
ctgcn' | qpgO"

Y g' r tgu'p'v' vj g' tguwu' qh' vj g' o ci o cve" hggf kpi " u{ ugo " uwf { " ceeqtf kpi " vq" vj g' f cvc" qh' vj g'
o letqugkuo le"uqwpf kpi . "ugkuo qvqo qi tcr j { "cpf "mcecn'ugkuo lek'f O'

Kp"4236/4237"lp"vj g'uqwj gtp'r ctv'qh'vj g"MI X" c"ugkuo qvqo qi tcr j le" gzr gtko gpv'y cu'ectt'kgf "qwu"
Mco ej cncp'tgi kpcn'ugkuo le"pgy qtm'y cu'uw r ngo gpvgf "d { "vgo r qtct { "ugkuo le"ucv'kpu" *Mqwrncqx" gv'cnO"
4239+0F wg"vq"vj ku. "k'dgeco g'r quikdr"vq"eqputwev'c"vqo qi tcr j le"o qf gn'wpf gt "Vqrdcej kni'cpf "lp" xlekp'k' O'Kp"
vj ku'o qf gn'vj tgg"o ckp" hggf kpi "ej cpgnu"qt"o ci o c'uw r rkgu'y gtg'f kpkpi wkj gf O'Supply I'ku'mcevgf "wpf gt"vj g"
egpvtcn'r ctv'qh'VF " *wpf gt"ctgc"qh'P qt vj gtp'dtgc'mj tqwi j "qh'vj g"3; 97/3; 98"Vqrdcej kni'gtw v'kq+O'Supply II'ku"
mcevgf "f ktgewf "wpf gt"vj g'Rrquf "Vqrdcej kni'gf hleg"cpf "qp"fr gr vj " ~37/42"no "k'f gxcv'gu"vqy ctf u'vj g'pqt vj "vq"
Dgl { o { cpp { "cpf "Mn{ wej gxunq { "xqrepcqgu. "vj cv'o c { "lpf kecv. "vj cv'vj gug"vj tgg"xqrepcqgu" hggf "htqo "vj g'uco g"
f ggr " | qpgO'Supply III'y cu'f gvevgf "lp"vj g'ctgc"qh'vj g"WF lpc"xqrepcqguO'

Kp"4232/4237"vj g'utwewt"qh'o ci o cve"u{ ugo "qh"Vqrdcej kni'ctgcn'xqrepcle" hgrf "y cu'uwf kgf "d { "vj g"
o gvj qf "qh"m'y /htgs wgepe { "o letqugkuo le"uqwpf kpi " *O UO + " *Mwi cgpnu" gv'cnO"423: +0Vj g"o ckp"i qcn'qh'vj ku"
uwf { "y cu'f ktgev'qp"vj g'egpvtcn'r ctv'qh'vj g"Vqrdcej kni'F qn'ctgc"qh'vj g"3; 97" hkuwt g"gtw v'kq+cpf "vj g" hq'v'qh"
Rrquf "Vqrdcej kni'xqrepcq"ctgc"qh'vj g"4234/4235" hkuwt g"gtw v'kq+0Vj gug"uwf lgu"o cng"kw'r quikdr"vq" f gv'k'
vj g'utwewt"qh'Supply I cpf "vj g" hggf kpi "ej cpgnu"qh'vj g"J qmeggp" hkuwt g"gtw v'kq+O'Kp"vj ku'y c { "dpggcj "
vj tgg" f khtgtp'v'ci g' hkuwt g"dtgc'mj tqwi j u'lp"vj g'egpvtcn'r ctv'VF "y g'f gvevgf "qtf gtgf "uw r n { "u{ ugo <"vj g"
uwxgt'v'ecr'o ci o c'eqpf vku'mcevgf "enqug"vq' gvj gt"y kj "vj g"o ci o cve"tgugtxqktu"cv'vj g'f gr vj u'qh'86; "cpf "
30/66"no O'Vj g'o wwn'r quikdr"qh'vj g'tqqv'qh'vj gug" hkuwt g"dtgc'mj tqwi j u'cmqy u'dcucnu"o qxkpi "f khtgtpv"
r cvj u" vq" tkgu" vq" vj g" uwthceg" y j lej "ecp" gzr r'k'p" vj g" uko wncpgqwu" uw r n { "qh" vj g" dcucnu" y kj " f khtgtpv"
eqo r quikdr"qp'vq"vj g'uwthceg" f vt'kpi "c"ukpi ng"gtw v'kq+O'K'ku'uj qy p'vj cv'vj g'grgo gpv'qh'vj g'o ci o cve" hggf kpi "
u{ ugo "dpggcj "vj g'vj tgg"uwf kgf "hkuwt g"dtgc'mj tqwi j u'ctg"uko kct "vq" gcej "qvj gtO'Vj g'hce'v'vj cv'vj g'tguwu'ctg"
tgr tqf wegf "cmppi "vj g'vj tgg'r tq'k'gu"v'ku'k'gu"vq"vj g'tgcn'gz'kugpeg'qh'vj g'tg'xgcngf "f ggr "utwewt gu'OJ gpeg. "k'ecp"
dg"j { r qv' g'k'gf "vj cv'vj g'tgi wrtk'v' "ku'tg'xgcngf "lp"vj g'eqp'k' v'c'v'kq"qh'vj g' hggf kpi "u{ ugo u'qh'vj g'gtw v'kq+O'Kp"
vj g'egpvtcn'r ctv'qh'vj g"VF O"

Supply II"eqp'k' v'c'v'kq"ku"lp"i qaf "eqttgur qpf gpeg"y kj "ugkuo le"cev'xk' cv'kq" *Mwi cgpnu" gv'cnO"4237+
cpf "ugkuo lek'v' "o ki tcv'kq" *Ecvf tqp" gv'cnO"4237+r tkqt"vj g"4234/4235"gtw v'kq+O'Vj g"O UO "uwf { "lp"vj g'tgi kpp"
qh' vj g" 423464235" gtw v'kq" j cu"uj qy p" vj cv'ku" unq' kpi " hggf kpi " eqpf v'k' tkgu" htqo " dpggcj " vj g" Rrquf k'
Vqrdcej kni'xqrepcq"htqo "c" f gr vj "qh'366"no "y j lej "eqttgur qpf u'vq"vj g'lpvtwukp"qh'vj g'tcf kcn'f kngO'Vj g'ctgc"qh"
vj g'o ci o cve"ej co dgt"vj cv'hgf "vj ku'gtw v'kq"ku'r qqt' "gzr tgu'gf "lp"vj g"O UO "ugev'kpu. r tqdcdn' "lpf kecv'kpi "ku"
f gi tcf cv'kq"ch'gt"vj g'eqo r ng'v'kq"qh'vj g'gtw v'kq+r tqegu' *w r gt'r ctv'qh'Supply II)O"

Kp"xlekp'k' "qh'Supply III"ctgc"qh'vj g"WF lpc"xqrepcqgu"lp"4239/423: "ugkuo le"cev'xk' cv'kq"vj cu'dggp"
tgeqtf gf "hqt"vj g'hku'v'ko g'f vt'kpi "kp'utwo g'v'cn'ugkuo qm'i lecn'qdu'gt'xc'v'kpu" *Qevq'dgt"4239"o"uwo o gt"423: +0
Cu"lp"vj g'ecug"qh'r tgr ctv'kq"qh'vj g"4234/4235"Vqrdcej kni'gtw v'kq" *Ci wuv'P qxgo dgt"4234+ "qpn' "y gcn'
gct'v' s wcn'gu" *O ">"5+"ctg" tgeqtf gf "lp" WF lpc" ctgcO' Vj g" t'cpi g" qh' gct'v' s wcn'g" f gr vj " *o quw' "J ">"32" no +
eqttgur qpf u'vq" c" r quikdr" r gtr j g'cn' o ci o cve" ej co dgt" *Vko gtdc'gxc." 3; 89+0' Vj g" gct'v' s wcn'g" enq'w' "
eqttgur qpf u'vq"vj g"GUG/Y P Y "htcewtg. "ukpi ng'ht"vj g"WF lpc"cpf "Vqrdcej kni'xqrepcqguO"

Vj wu. "vj g"3; 97"cpf "4234/4235"Vqrdcej kni' hkuwt g"gtw v'kq+O'Vj g'eev'wtgf "lp"vj g'gu'p'v'k'cn' "f khtgtpv'r ctw"
qh'vj g"Vqrdcej kni'F qn' O'K' gp'v'k'gf "d { "O UO "cpf "ugkuo qvqo qi tcr j { "vj g'tc'puet wuv'uw r r'k'gf "eqnwo p"wpf gt"vj g"
egpvtcn'ugev'kq"qh'vj g"Vqrdcej kni'ctgcn'xqrepcle" hgrf "cuwo gu'c" f ktgev'o cp'v'g' hggf kpi "qh'vj g' hkuwt g"gtw v'kq+O'

"

Kp"eqpvtuv"vq"vj g"hgff kpi "| qpg"qh"vj g"4234/4235"gtwr vkqp."vj g"o ci o c"tgugt xqtu"cpf "hgff kpi "eqpf wku" dpggcj "vj g"egpvtcnr ctv'qh"VF "ctg'engctn' "xkucnk' gf "qp"vj g"O UO "ugevkpu0Vj ku'kpf kecvgu'vj cv'kp"vj g"uqwj gtp" r ctv'qh'vj g"MXI . "kp"vj g"Gctvj au'et wuv'vj gtg'ku" c"tcpuet wucnr' kr g'y j gtg'o ci o cvk"o gn'ecp'r gtukuv'gxgp"kp"vj g" npi "cdugpeg'qh'vj g"gtwr vkpu0

Ugkuo le"cevkxk' cvkqp"kp"vj g"ctgc"qh"Wf kpc"xqrecpqu."y j lej "qeewtgfc"hgfy "{ gctu'chgt"vj g"Vqrdcej kn' gtwr vkqp."eqphko u"vj g"mcevkqp"qh'vj gug"xqrecpqu"qp" c"ukpi ng"huuwtg"|" qpg0'Rgtj cr u"vj gk"ki pgqwu"hgff kpi " u{ ugo u'ctg'kpvgteqppgevgf 0

Vj g"o ci o cvk"ej co dgt "wpf gt'Rmumf "Vqrdcej kn'ku'pqv'f kuki wuj gf "gkj gt'd{ "ugkuo qvi ter j { ."qt'd{ " O UO 0""

"

Tghgtgpegu"

Ecwf tqp"E0#Vckupg"D0#Mwi cgpna"[w0#Ucnf' nax"X0*4237+"O ci o c"o ki tvkqp"cv'vj g"qpugv'qh'vj g"4234/35" Vqrdcej kn'gtwr vkqp"tgxgcrgf "d{ "Ugkuo le"Co r rkwf g"Tvckq"Cpcn'ugu"ll"J. *Volcanol. Geotherm. Res.* 529.'826880'F QK'320238'l'0xqni gqtgu042370; 032"

Mqwrnax"K'C dncf { tqx"K'Ct'k'P 0'F ggx'G0'gv'cn0*4239+"Vj tgg'f k'htg'gpv'v' r gu'qh'r nwo dkpi "u{ ugo u'dpggcj " vj g"pgki j dqt'kpi "cevkxg"xqrecpqu"qh'Vqrdcej kn"Dgl { o kcpp{ "cpf "Mn'wej gxunq{ "kp"Mc0 ej cvn"ll"J. *Geophys. Res. Solid Earth.* "344*7+; 5: 7465: 960F QK'320224l4239lD2362: 4"

Mwi cgpna"[w0"Ucnf' nax"X0'I qtxcvknax"C0"Ugr cpqxc"O 0*423: +F ggr "Utwewtg"qh'vj g" qpg"qh'Vqrdcej kn' Hkuwtg" Gt wr vkqp" *Mc0 ej cvn." Mn'wej gxunq{ " Xqrecpq" I tqwr +< Gxkf gpeg" Itqo " c" Eqo r rgz" qh' I gqni kecn'cpf" I gqr j { ukecn'F cv"ll" *Izvestiya, Physics of the Solid Earth.* "76*5+;"666/6870'F QK' 320356lU328; 57353: 25227; "

Mwi cgpna"[w0"Vknax" P 0"Ucnf' nax"X0*4237+"Eqpvtckpu" qp" wptguv'kp" vj g"Vqrdcej kn'xqrecple"|" qpg"kp" Mc0 ej cvn"r tkqt"vj g"4234/35"ncpn'huuwtg"qh'Rmumf "Vqrdcej kn'xqrecpq"ltqo "mecn'ugkuo kek' "cpf " I RU'f cv"ll"J. *Volcanol. Geotherm. Res.* "529.'5: 6680'F QK'320238'l'0xqni gqtgu0423707042""

Vlo gtdegcx."M0 0*3; 89+"Rgtqni { "qh'Mn'wej gxunq'xqrecpqu'kp"Mc0 ej cvn00 Q'P cvn042; "r 0

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