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New calibration of Ji - Di clinopyroxene barometer for Eclogites, pyroxenites and peridotites and eclogite - pyroxenite mantle geotherms.

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Checking the universe clinopyroxene JD-Di barometer on the experimental system showed that it better to use the separate schemes for the eclogite and peridotite systems.
The clinopyroxene barometer based on the internal exchange of Jd-Di components for the Al. It allow using the temperature calculated with the (Krogh, 1988) method for the
The barometer was calibrated on the 200 experimental runs for the eclogitic system (Yaxley,Brey,2004; Spandler ea, 2008; Konzett ea, 2008; Hanrahan ea, 2009 and references there in). It reproduces the pressure range to 120 kbar with the r= 0.91 (S=8) for 180 experimental runs.
P(Ash2010 Ecl)=0.32 (1-0.215*Na/Al+0.012*Fe/Na)*Kdˆ3/4*ToK/(1+Fe)*(1+5*Fe)-
35*ln(1273/ToK)*(Al+Ti+2.5Na+1.5Fe3+)+(0.9-xx(2,8))*10+xx(2,9)/xx(2,3)* ToK /200-1.5
P1=(0.00004*Pˆ3-0.0091*Pˆ2+1.3936*P)*1.05
Where KD = Na*Mg/xAlCr*/Ca; XAlCr= Al+Cr+4*Ti-K-(Fe-0.21)*0.75
The tests on the natural associations form the eclogitic xenoliths with and without the diamonds and omphacite diamond inclusions (Taylor ea, 2006; Shatsky ea, 2008; Jacob ea, 2009) have shown very good agreement with the position of the Graphite -Diamond (Kennedy, Kennedy, 1977) boundary and to the conductive geotherms which are close to 34-36mvm-2 geotherms while for the South Africa they are more close to 40mvm-2 geotherms. For the zonal omphacites it produces the range of the nearly equal pressures or more rarely advective paths. The levels of the maximum enrichments in eclogites which are close to 50-60 kabr beneath 360ma Siberian kimberlites coincides with the levels of heating according to the monomineral and polymineral thermobarometry. South Africa eclogite geotherms often split into 2-3 branches: subductional (35) conductive (40) for Paleozoic-Mesozoic mantle lithosphere and the hottest advective close o 45 mv/m-2.
For the pyroxenite compositions the barometer was rearranged to by the adding the temperature influence on Al , Ta, Fe exactly in KD as following:
P(Ash2010 Per-Pxt)=0.275*(1-0.17*Na/Al+0.0115*Fe/Na)*Kdˆ3/4*ToK/(1+Fe)* (1+5*Fe*(ToK-600)/50)-
35*ln(1273/ToK)*(Al+Ti+2.5Na+1.5Fe3+)+(0.9-xx(2,8))*10+xx(2,9)/xx(2,3)* ToK /300-4*(Fe*33.2-4) -(Al-5.5)*(ToK -1300)/70-(ToK -1200)*0.015
with the second correction P=P*0.65+10+Mg*Al*(ToK -1400)/500
Where KD = Na*Mg/xAlCr*/Ca;
XAlCr= Al*((T0-800)/800)**0.25+Cr-K+(4*Ti-0.0125)/(T0-600)*400+(Fe-0.21)*(T0-600)/14000
This equations reproduces the experimental pressures for 300 experimental runs with the R=0.84 and for the best set of the experimental data (Walter, 1999; Taylor ea 1998; Brey Kohler, 1990; 2009) with the E=0.95 (s=7) within the 100 kbar interval. They allow to work with the wide range of the pyroxenite compositions giving the practically coinciding PT parameters with the pressures determined for ilmenites and chromites as well as the (Brey, Kohler, 1900) pressure estimates.
The PT parameters reconstructed for the mantle lithosphere beneath > 120 pipes from Yakutia , Baltica, Africa , North America and other world wide kimberlites have shown very good coincidence with the estimates from the other methods of monomineral (Nimis, Taylor, 2000; McGregor, 1974; Ashchepkov ea. 2009) and Gar-Opx barometers (Brey, Kohler, 1900; Nickel, Green, 1975).
For the garnet and spinel xenoliths of the alkali basalts representing fertile or regenerated peridotites with high Al content of the clinopyroxenes the modified equation allows to determine the pressures together for megacrysts, pyroxeniets and peridotites using the following equation

P=0.035*Kd*ToK)/(1+3.5*Fe)- 50*ln(1273/(ToK-100)*(Al+5*Na-Ti+2*Cr)
-(Na-0.050)*(ToK-1200)*(Ca-0.85)/7000+5
Where KD = Na*Mg/xAlCr*/Ca;
xAlCr= (Al+Si-2)*((ToK-700)/900)^0.35+Cr+Fe3-K +(4*Ti-0.0125)/(ToK-600)*700 +(Fe-0.21)*(ToK-400)/17000
This equations also very good reproduce the experimental runs in the pressure interval from 10 to 80 kbar but better to 50 kbars (R=0.92) (S=5) for 170 experimental runs (Putirka ea, 1996; Fallon ea, 1999; Taylor ea, 1998; Drapper Green, 1997; Lambart ea 2009) in this pressure range.