Isobar_Comparison_Plotter

September 28, 2020

[2]:
```
import sys
sys.path.append('../../../')

import VESIcal as v
import pandas as pd
```

[6]:
```
alkbasalt = {'SiO2': 49.0,
                'TiO2': 1.27,
                'Al2O3': 19.7,
                'Fe2O3': 3.74,
                'FeO': 5.33,
                'MnO': 0.17,
                'MgO': 4.82,
                'CaO': 8.85,
                'Na2O': 4.23,
                'K2O': 1.00,
                'P2O5': 0.37,
                'H2O': 4.51,
                'CO2': 0.25}

rhyolite = {'SiO2':77.19,
                 'TiO2':0.06,
                 'Al2O3':12.80,
                 'FeO':0.94,
                 'MgO':0.03,
                 'CaO':0.53,
                 'Na2O':3.98,
                 'K2O':4.65,
                 'CO2':0.05,
                 'H2O':0.26}

sample_table = pd.DataFrame([alkbasalt, rhyolite], index=["Alkali Basalt",␣
↪"Rhyolite"])
sample_table
```

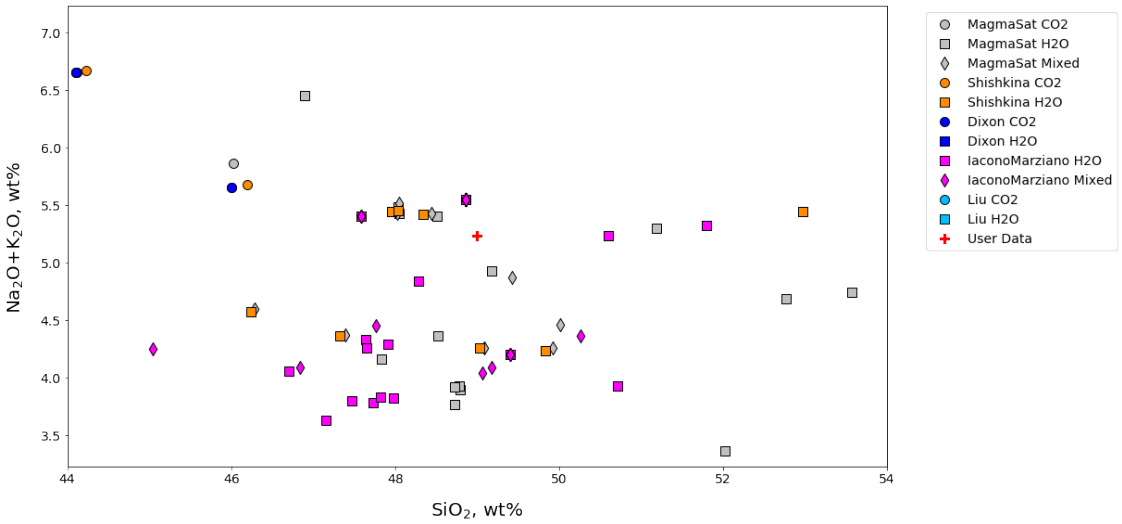
[6]:

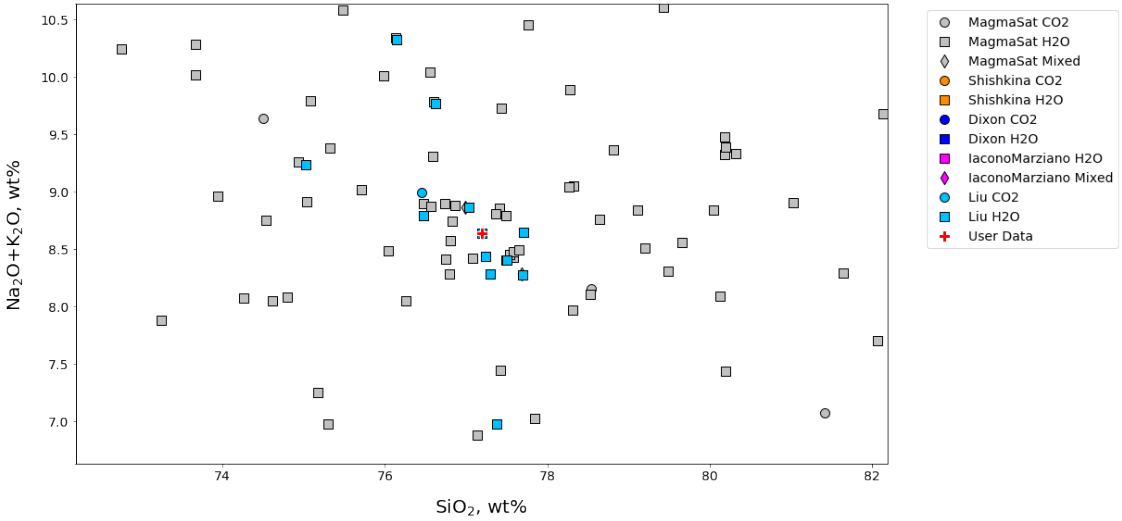
	SiO2	TiO2	Al2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	K2O	\
Alkali Basalt	49.00	1.27	19.7	3.74	5.33	0.17	4.82	8.85	4.23	1.00	

```
Rhyolite       77.19  0.06   12.8    NaN  0.94   NaN  0.03  0.53  3.98  4.65

               P2O5   H2O   CO2
Alkali Basalt  0.37  4.51  0.25
Rhyolite        NaN  0.26  0.05
```

[15]:
```
#check calibration
v.calib_plot(user_data=alkbasalt, model='mixed', zoom='user_data')
v.calib_plot(user_data=rhyolite, model='mixed', zoom='user_data')
```





[5]:
```
alkbasalt_isobars, alkbasalt_isopleths = v.
 ↪calculate_isobars_and_isopleths(sample=alkbasalt, temperature=1200,␣
 ↪pressure_list=[500, 1000, 2000], isopleth_list=[0.5], print_status=True).
 ↪result

rhyolite_isobars, rhyolite_isopleths = v.
 ↪calculate_isobars_and_isopleths(sample=rhyolite, temperature=800,␣
 ↪pressure_list=[500, 1000, 2000], isopleth_list=[0.5]).result
```

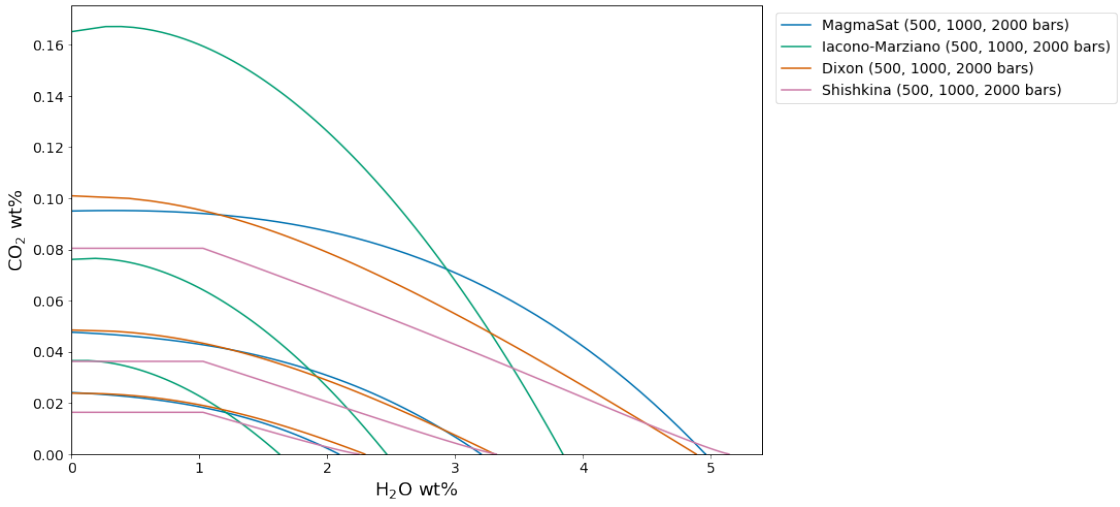
```
Calculating isobar at 500 bars
Calculating isopleth at 0
Calculating isopleth at 0.5
Calculating isopleth at 1
Calculating isobar at 1000 bars
Calculating isopleth at 0
Calculating isopleth at 0.5
Calculating isopleth at 1
Calculating isobar at 2000 bars
Calculating isopleth at 0
Calculating isopleth at 0.5
Calculating isopleth at 1
Done!
Calculating isobar at 500 bars
Calculating isopleth at 0
Calculating isopleth at 0.5
Calculating isopleth at 1
Calculating isobar at 1000 bars
Calculating isopleth at 0
Calculating isopleth at 0.5
Calculating isopleth at 1
Calculating isobar at 2000 bars
Calculating isopleth at 0
Calculating isopleth at 0.5
Calculating isopleth at 1
Done!
```

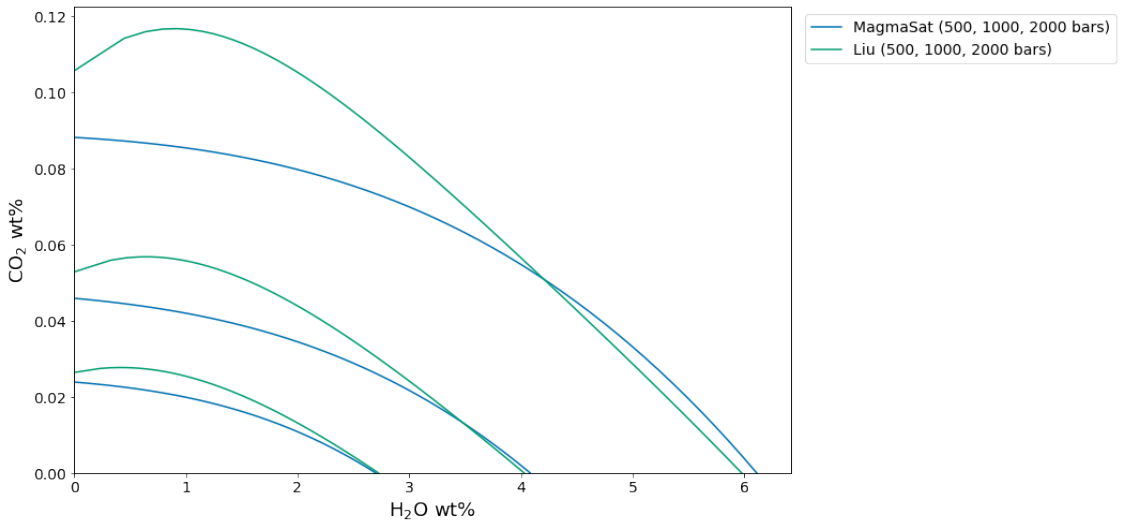
[6]:
```
Iac_alkbasalt_isobars, Iac_alkbasalt_isopleths = v.
 ↪calculate_isobars_and_isopleths(sample=alkbasalt, temperature=1200,␣
 ↪pressure_list=[500, 1000, 2000], isopleth_list=[0.5],␣
 ↪model="IaconoMarziano").result
Dixon_alkbasalt_isobars, Dixon_alkbasalt_isopleths = v.
 ↪calculate_isobars_and_isopleths(sample=alkbasalt, temperature=1200,␣
 ↪pressure_list=[500, 1000, 2000], isopleth_list=[0.5], model="Dixon").result
Shish_alkbasalt_isobars, Shish_alkbasalt_isopleths = v.
 ↪calculate_isobars_and_isopleths(sample=alkbasalt, temperature=1200,␣
 ↪pressure_list=[500, 1000, 2000], isopleth_list=[0.5], model="Shishkina").
 ↪result
```

```
Liu_rhyolite_isobars, Liu_rhyolite_isopleths = v.
 ↪calculate_isobars_and_isopleths(sample=rhyolite, temperature=800,␣
 ↪pressure_list=[500, 1000, 2000], isopleth_list=[0.5], model="Liu").result
```

```
../../../VESIcal.py:1719: RuntimeWarning: pressure exceeds 1000 bar, which
Iacono-Marziano et al. (2012) suggest as an upper calibration limit of the Dixon
(1997, Pi-SiO2 simpl.) Model,
  w.warn(self.calib_check,RuntimeWarning)
../../../VESIcal.py:1719: RuntimeWarning:  These calibration limits were
selected based on the minimum and maximum values of these oxides (+-5%) in the
calibration dataset. As the Liu et al. model incorperates no term for
compositional dependence, users must take extreme care when extrapolating this
model to compositions which differ significantly from the haplogranites and
rhyolites in the calibration dataset. These warnings are simply a guide; we
suggest that users carefully compare their major element data to the calibration
dataset to check for suitability
  w.warn(self.calib_check,RuntimeWarning)
```

[9]:
```
v.plot(isobars=[alkbasalt_isobars, Iac_alkbasalt_isobars,␣
 ↪Dixon_alkbasalt_isobars, Shish_alkbasalt_isobars],␣
 ↪isobar_labels=["MagmaSat", "Iacono-Marziano", "Dixon", "Shishkina"])
v.plot(isobars=[rhyolite_isobars, Liu_rhyolite_isobars],␣
 ↪isobar_labels=["MagmaSat", "Liu"])
```





[ ]:
```
v.plot(isobars=Shish_alkbasalt_isobars)
```

[ ]:

[ ]: