

S9_Isobar_Comparison_Plotter

March 30, 2021

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[1]: import VESical as v
import pandas as pd
```

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[2]: alkbasalt = v.Sample({'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 = v.Sample({'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})

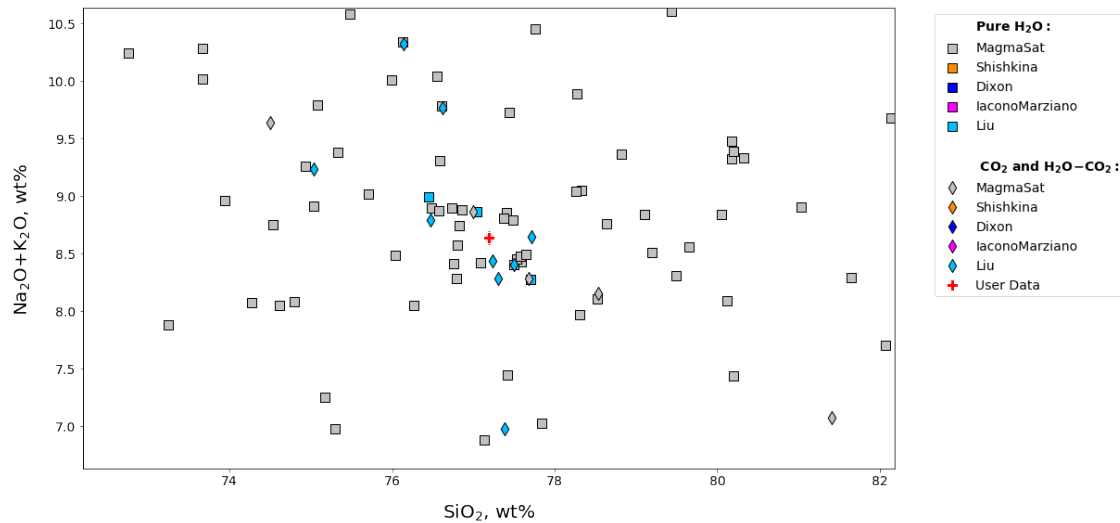
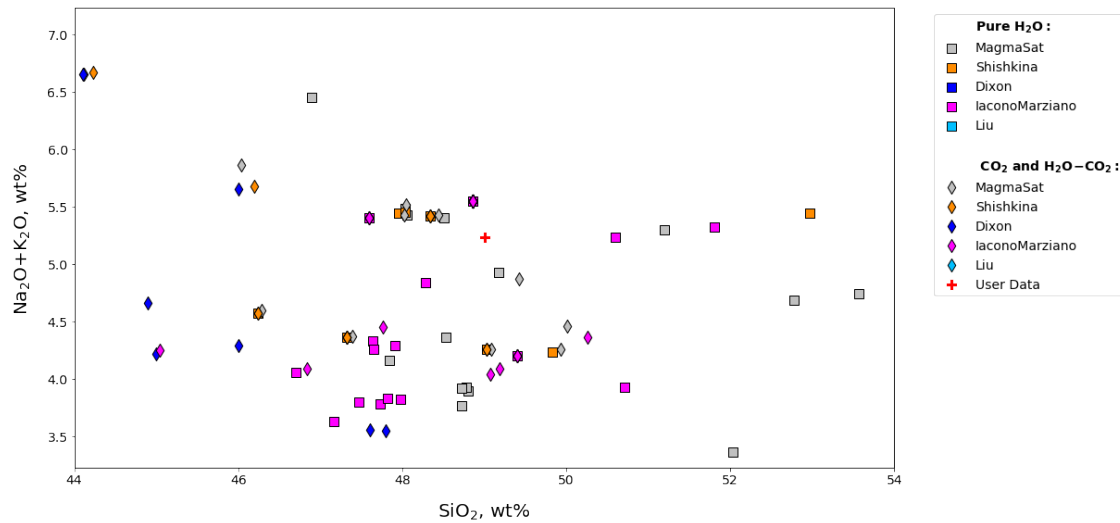
sample_table = pd.DataFrame([alkbasalt.get_composition(), rhyolite.
                             ↪get_composition()], index=["Alkali Basalt", "Rhyolite"])
sample_table
```

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[2]:
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	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

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



[4]:

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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
done.
Calculating isobar at 1000 bars
done.
Calculating isobar at 2000 bars
done.
Done!
Calculating isobar at 500 bars
done.
Calculating isobar at 1000 bars
done.
Calculating isobar at 2000 bars
done.
Done!

```

```

[5]: 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="ShishkinaIdealMixing").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

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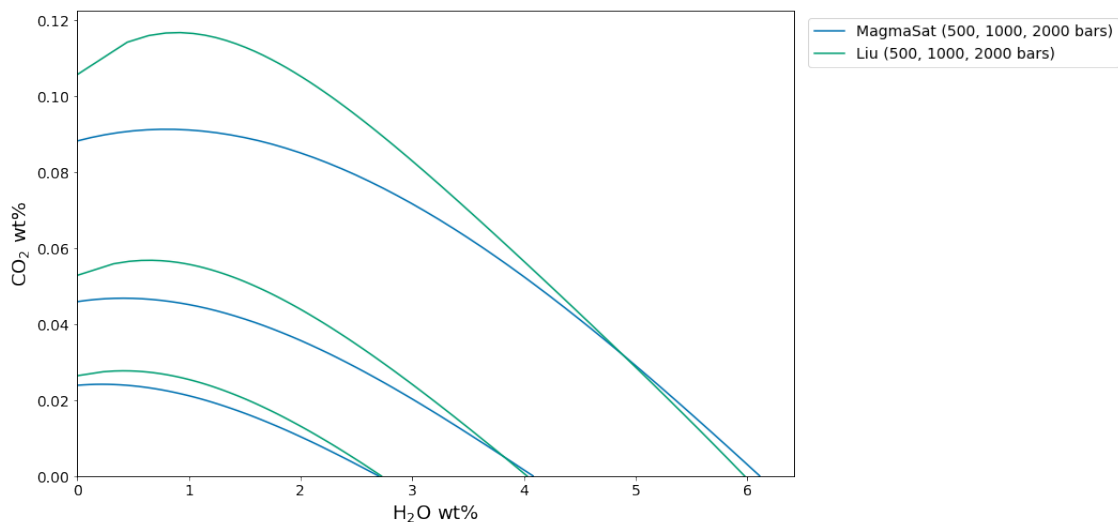
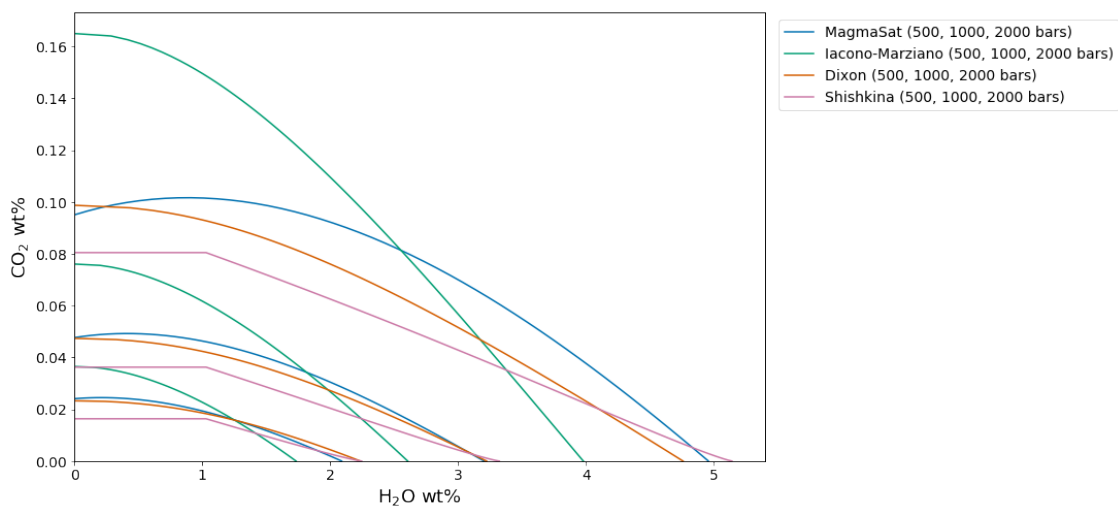
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/Users/kiacovin/Dropbox/Research/__Manuscripts in Progress/__VESIcal/__TheCode/V
ESIcal/manuscript/Supplement/JupyterNotebooks/Isobar_Comparison_Plotter/VESIcal/
calculate_classes.py:52: RuntimeWarning: pressure exceeds 1000 bar, which
Iacono-Marziano et al. (2012) suggest as an upper calibration limit of the Dixon
(1997, Pi-SiO2 simpl.) Model,
    w.warn(self.calib_check,RuntimeWarning)

```

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[6]: fig, ax = v.plot(isobars=[alkbasalt_isobars, Iac_alkbasalt_isobars,
    ↪ Dixon_alkbasalt_isobars, Shish_alkbasalt_isobars],
    ↪ isobar_labels=["MagmaSat", "Iacono-Marziano", "Dixon", "Shishkina"])
v.show()

fig, ax = v.plot(isobars=[rhyolite_isobars, Liu_rhyolite_isobars],
    ↪ isobar_labels=["MagmaSat", "Liu"])
v.show()
```



```
[7]: fig, ax = v.plot(isobars=Shish_alkbasalt_isobars)
v.show()
```

