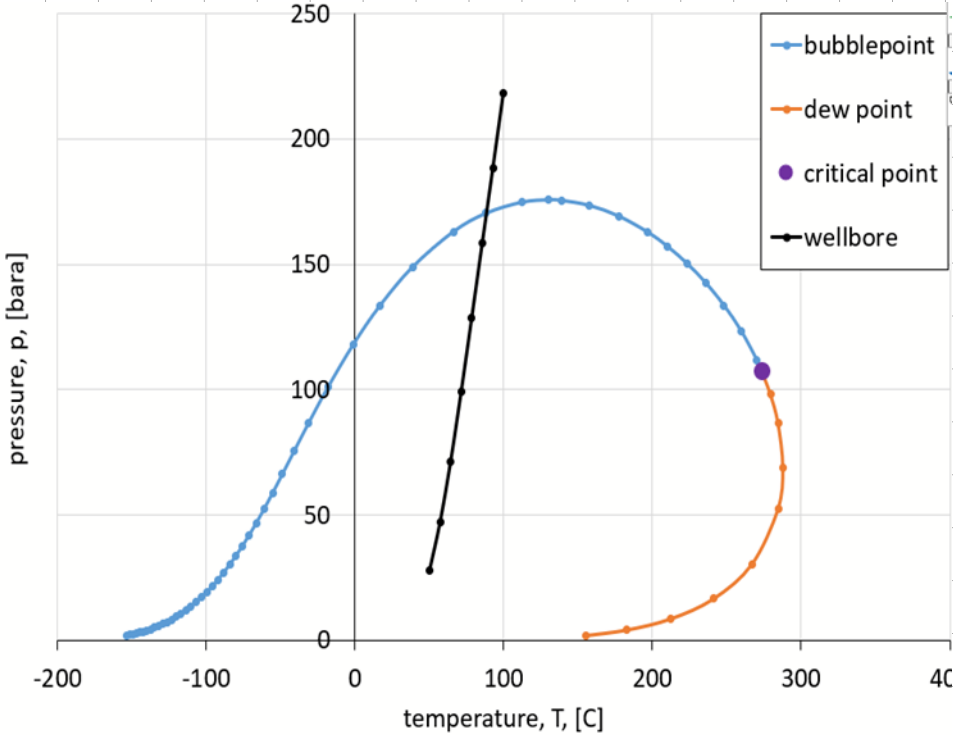
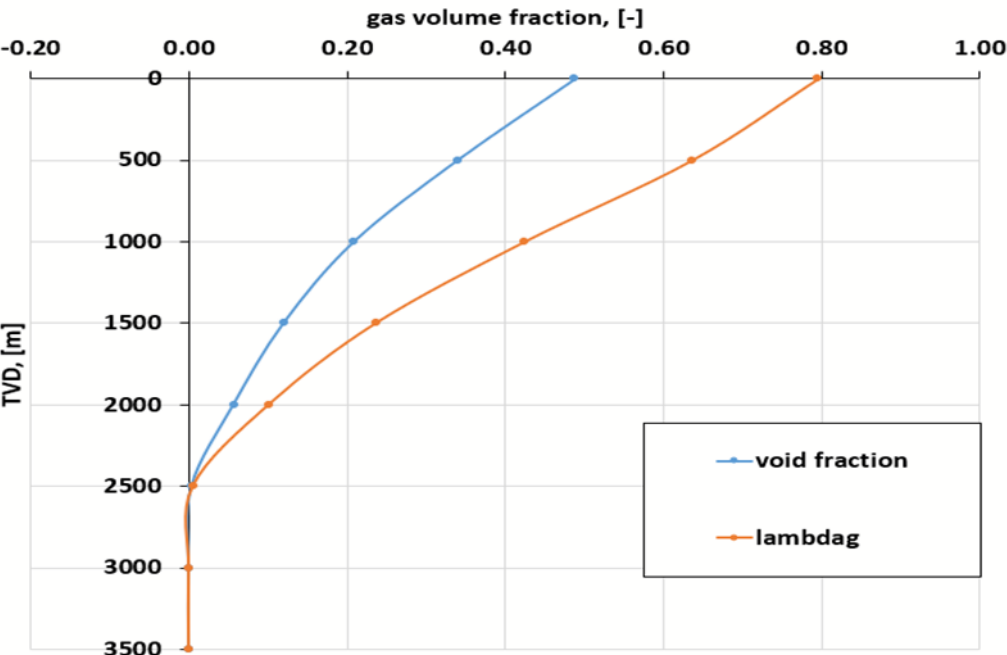
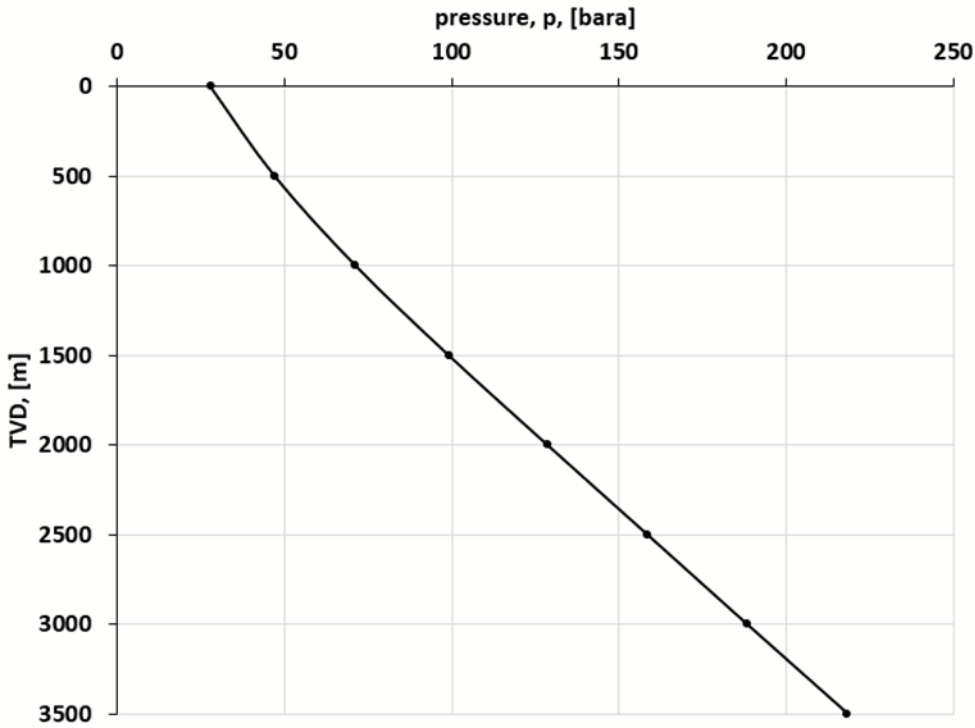
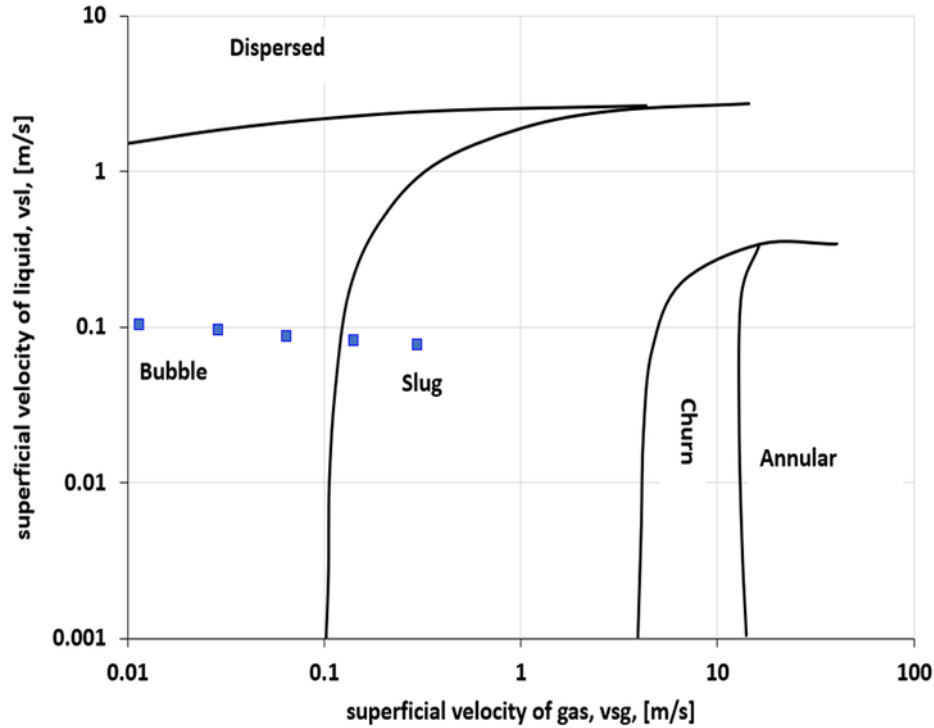


Exercise: Pressure drop calculation in saturated oil well, Prof. Milan Stanko (NTNU)

GOR	[Sm3/Sm3]	155.1																			
Pipe ID	[m]	0.15																			
Pipe cross section area	[m2]	0.0177																			
Pipe roughness	[m]	1.50E-05																			
Pipe inclination from hor	[deg]	90																			
qo	[Sm3/d]	100																			
qg	[Sm3/d]	1.55E+04																			
			BO table column	3	4	5	6	8	10	7	9	11								Woldesemayat and Ghajar	
	TVD [m]	T [C]	p[bara]	Rs [Sm3/Sm3]	rs [Sm3/Sm3]	Bo [m3/Sm3]	Bg [m3/Sm3]	deng [kg/m3]	viscg [cp]	deno [kg/m3]	viso [cp]	sigma_o_g [N/m]	qo [m3/d]	qg[m3/d]	uso [m/s]	usg [m/s]	lambdag[-]	e[-]	dp/dx [bara/m]		
	0	50.0	28	22.6	1.28E-05	1.2	3.44E-02	37.8	1.10E-02	728.8	1.8	1.15E-02	117.4	4.566E+02	0.077	0.299	0.80	0.49		0.0384	
	500	57.1	47.2	41.1	1.31E-05	1.2	1.90E-02	70.8	1.25E-02	708.8	1.2	8.37E-03	124.2	2.173E+02	0.081	0.142	0.64	0.34		0.0483	
	1000	64.3	71.4	65.3	1.43E-05	1.3	1.09E-02	119.4	1.49E-02	684.3	0.8	5.12E-03	133.2	9.832E+01	0.087	0.064	0.42	0.21		0.0556	
	1500	71.4	99.2	93.9	1.69E-05	1.4	7.29E-03	178.7	1.91E-02	657.3	0.6	2.64E-03	144.4	4.468E+01	0.095	0.029	0.24	0.12		0.0589	
	2000	78.6	128.6	124.4	2.13E-05	1.6	5.71E-03	228.2	2.38E-02	630.8	0.5	1.33E-03	156.8	1.761E+01	0.103	0.012	0.10	0.06		0.0597	
	2500	85.7	158.4	153.2	2.41E-05	1.7	4.49E-03	229.5	2.44E-02	607.9	0.4	6.71E-04	169.0	8.799E-01	0.111	0.001	0.01	0.00		0.0595	
	3000	92.9	188.2	155.1	0.00E+00	1.7	0.00E+00	0.0	0.00E+00	607.3	0.4	0.00E+00	169.5	0.000E+00	0.111	0.000	0.00	0.00		0.0602	
	3500	100.0	218.3	155.1	0.00E+00	1.7	0.00E+00	0.0	0.00E+00	607.4	0.4	0.00E+00	169.5	0.000E+00	0.111	0.000	0.00	0.00		0.0602	

Flow pattern map, 90o, upward vertical flow



With Wolgha model

pwh[bara]	28	50	70
qo	pwf	pwf	pwf
[Sm3/d]	[bara]	[bara]	[bara]
100	218.3	254.9	281.4
250	200.0	247.1	278.3
500	188.5	243.0	278.2
1000	182.4	243.0	281.8
2000	186.9	250.8	292.9
3000	199.2	262.8	306.3
4000	224.5	277.3	
5000	245.2	294.0	
6000	280.5	327.0	

