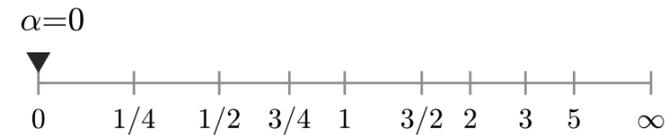


$\Omega_1$ : Barro Colorado Island, 1985 Census

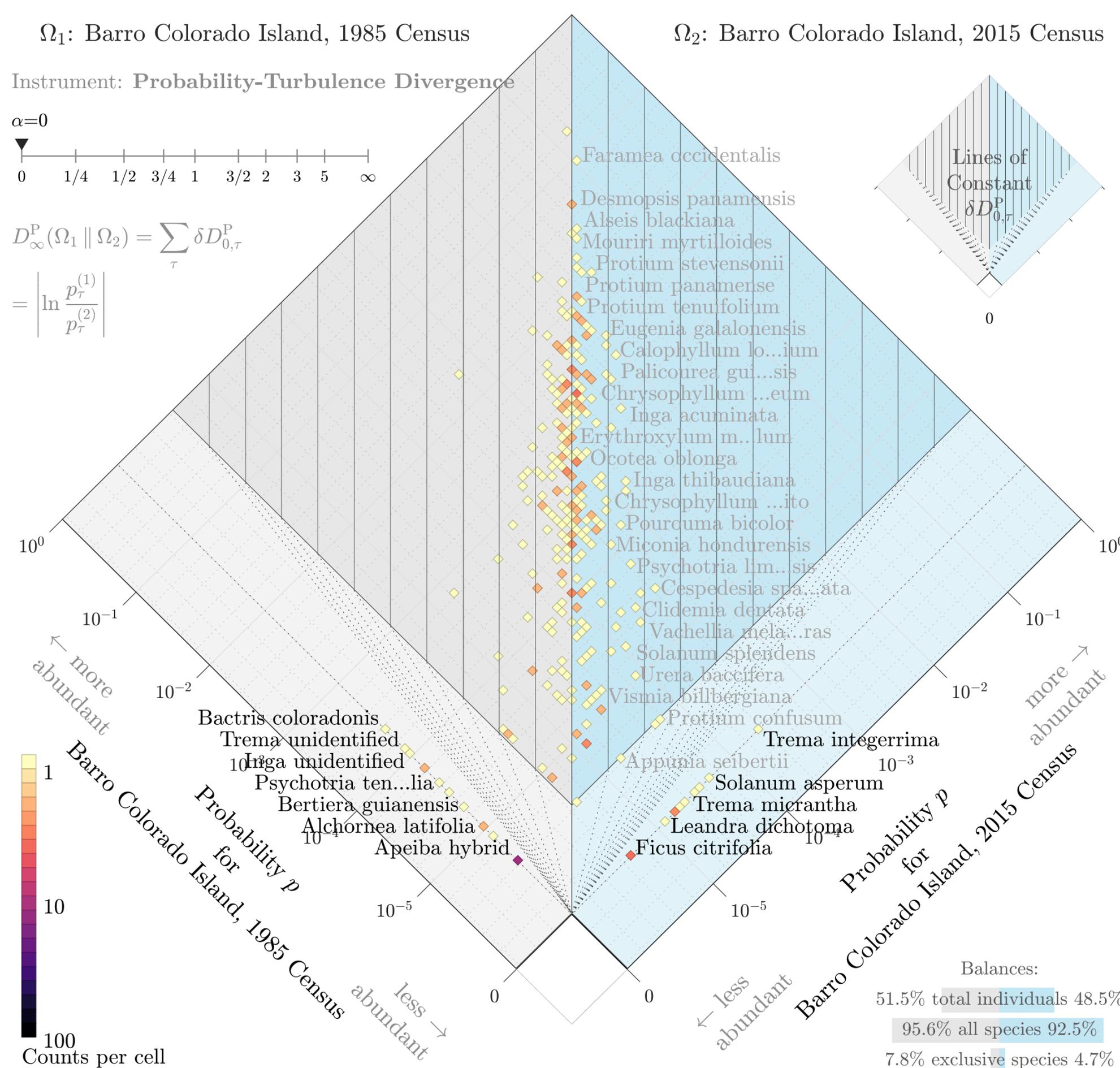
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_{\infty}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{0,\tau}^P$$

$$= \left| \ln \frac{p_{\tau}^{(1)}}{p_{\tau}^{(2)}} \right|$$



Divergence contribution  $\delta D_{0,\tau}^P$  (%)

	2	1	0	1	2
◁Bactris coloradonis	185	⇒	308		
				313	⇒195
◁Trema unidentified	209	⇒	308		
◁Inga unidentified	215	⇒	308		
◁Geonoma interrupta	228	⇒	308		
◁Koanophyllon wetmorei	231	⇒	308		
				313	⇒240
◁Psychotria tenuifolia	241	⇒	308		
				313	⇒246
				313	⇒250
◁Cyathea petiolata	255	⇒	308		
				313	⇒259
				313	⇒262
◁Bertiera guianensis	266	⇒	308		
				313	⇒269
				313	⇒269
				313	⇒269
				313	⇒278
◁Alchornea latifolia	277	⇒	308		
◁Pavonia dasypetala	277	⇒	308		
◁Annona hayesii	286	⇒	308		
				313	⇒290
				313	⇒290
				313	⇒290
				313	⇒290
◁Apeiba hybrid	298	⇒	308		
◁Ficus colubrinae	298	⇒	308		
◁Inga mucuna	298	⇒	308		
◁Lycianthes maxonii	298	⇒	308		
◁Solanum arboreum	298	⇒	308		
◁Ternstroemia tepezapote	298	⇒	308		
◁Vismia macrophylla	298	⇒	308		
◁Xylosma chlorantha	298	⇒	308		
◁Zanthoxylum setulosum	298	⇒	308		
◁Nectandra sp.4_(tin...af)	298	⇒	308		
◁Schefflera morototoni	298	⇒	308		
◁Ficus matiziana	298	⇒	308		
◁Alibertia patinoi	298	⇒	308		

63.2%—36.8%

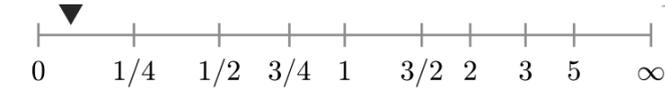
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{1/12,\tau}^P$  (%)

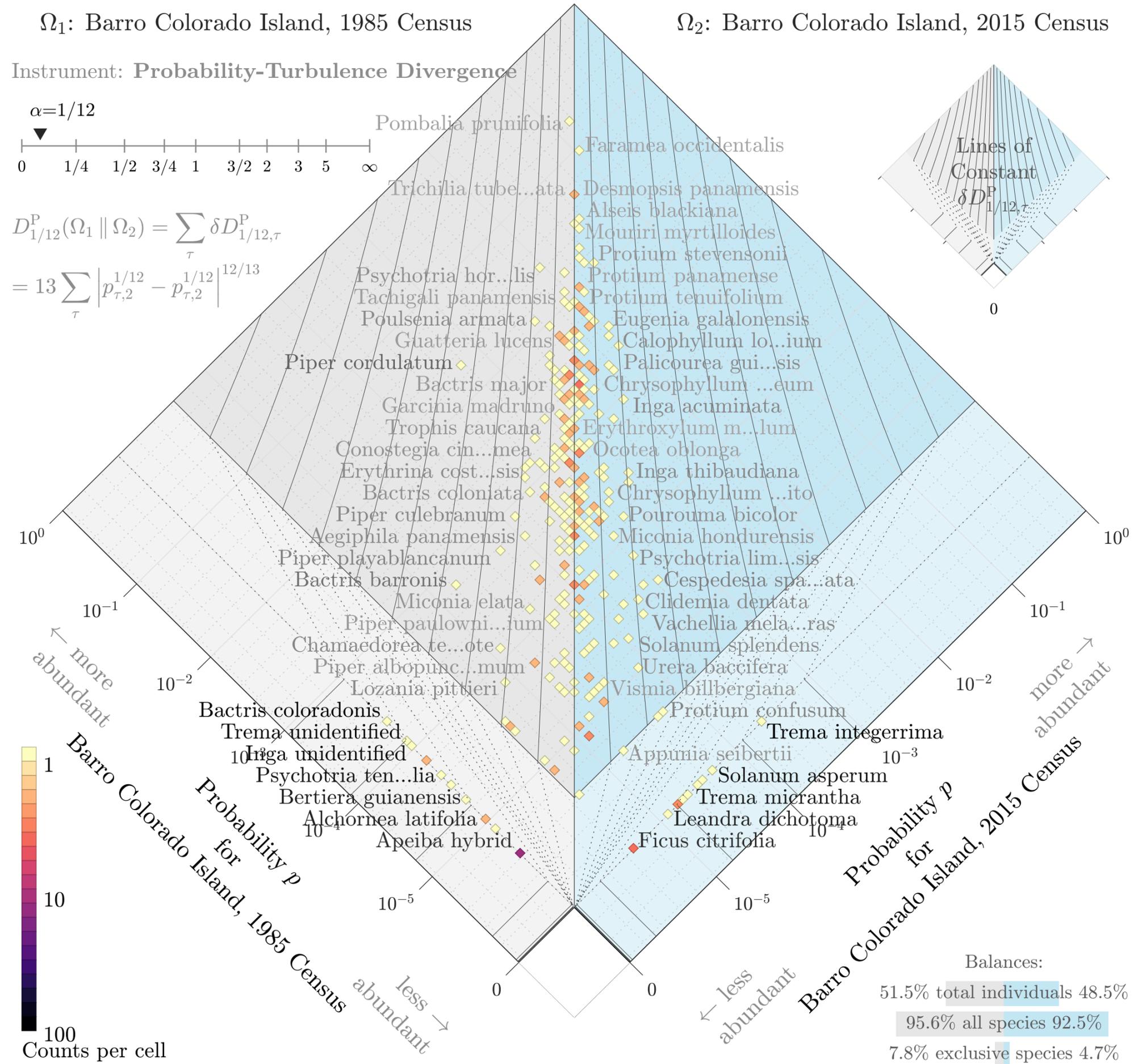
Instrument: **Probability-Turbulence Divergence**

$\alpha=1/12$



$$D_{1/12}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{1/12,\tau}^P$$

$$= 13 \sum_{\tau} \left| p_{\tau,2}^{1/12} - p_{\tau,2}^{1/12} \right|^{12/13}$$



$\triangleleft$ Bactris coloradonis	185 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 195
$\triangleright$ Trema integerrima	
$\triangleleft$ Trema unidentified	209 $\rightleftharpoons$ 308
$\triangleleft$ Inga unidentified	215 $\rightleftharpoons$ 308
$\triangleleft$ Geonoma interrupta	228 $\rightleftharpoons$ 308
$\triangleleft$ Koanophyllon wetmorei	231 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 240
$\triangleright$ Solanum asperum	
$\triangleleft$ Psychotria tenuifolia	241 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 246
$\triangleright$ Cecropia longipes	
	313 $\rightleftharpoons$ 250
$\triangleright$ Miconia dorsiloba	
$\triangleleft$ Cyathea petiolata	255 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 259
$\triangleright$ Trema micrantha	
	313 $\rightleftharpoons$ 262
$\triangleright$ Jacaratia spinosa	
$\triangleleft$ Bertiera guianensis	266 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 269
$\triangleright$ Ficus pertusa	
	313 $\rightleftharpoons$ 269
$\triangleright$ Miconia prasina	
	313 $\rightleftharpoons$ 269
$\triangleright$ Cestrum racemosum	
	313 $\rightleftharpoons$ 278
$\triangleright$ Leandra dichotoma	
$\triangleleft$ Alchornea latifolia	277 $\rightleftharpoons$ 308
$\triangleleft$ Pavonia dasypetala	277 $\rightleftharpoons$ 308
$\triangleleft$ Annona hayesii	286 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 290
$\triangleright$ Ficus citrifolia	
	313 $\rightleftharpoons$ 290
$\triangleright$ Piper longispicum	
	313 $\rightleftharpoons$ 290
$\triangleright$ Rauvolfia littoralis	
	313 $\rightleftharpoons$ 290
$\triangleright$ Verbesina gigantea	
$\triangleleft$ Apeiba hybrid	298 $\rightleftharpoons$ 308
$\triangleleft$ Ficus colubrinae	298 $\rightleftharpoons$ 308
$\triangleleft$ Inga mucuna	298 $\rightleftharpoons$ 308
$\triangleleft$ Lycianthes maxonii	298 $\rightleftharpoons$ 308
$\triangleleft$ Solanum arboreum	298 $\rightleftharpoons$ 308
$\triangleleft$ Ternstroemia tepezapote	298 $\rightleftharpoons$ 308
$\triangleleft$ Vismia macrophylla	298 $\rightleftharpoons$ 308
$\triangleleft$ Xylosma chlorantha	298 $\rightleftharpoons$ 308
$\triangleleft$ Zanthoxylum setulosum	298 $\rightleftharpoons$ 308
$\triangleleft$ Nectandra sp.4_(tin...af)	298 $\rightleftharpoons$ 308
$\triangleleft$ Schefflera morototoni	298 $\rightleftharpoons$ 308
$\triangleleft$ Ficus matiziana	298 $\rightleftharpoons$ 308
$\triangleleft$ Alibertia patinoi	298 $\rightleftharpoons$ 308
Piper cordulatum	9 $\rightleftharpoons$ 138
Bactris barronis	137 $\rightleftharpoons$ 269

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

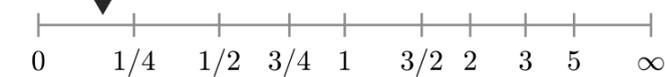
57.6%—42.4%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

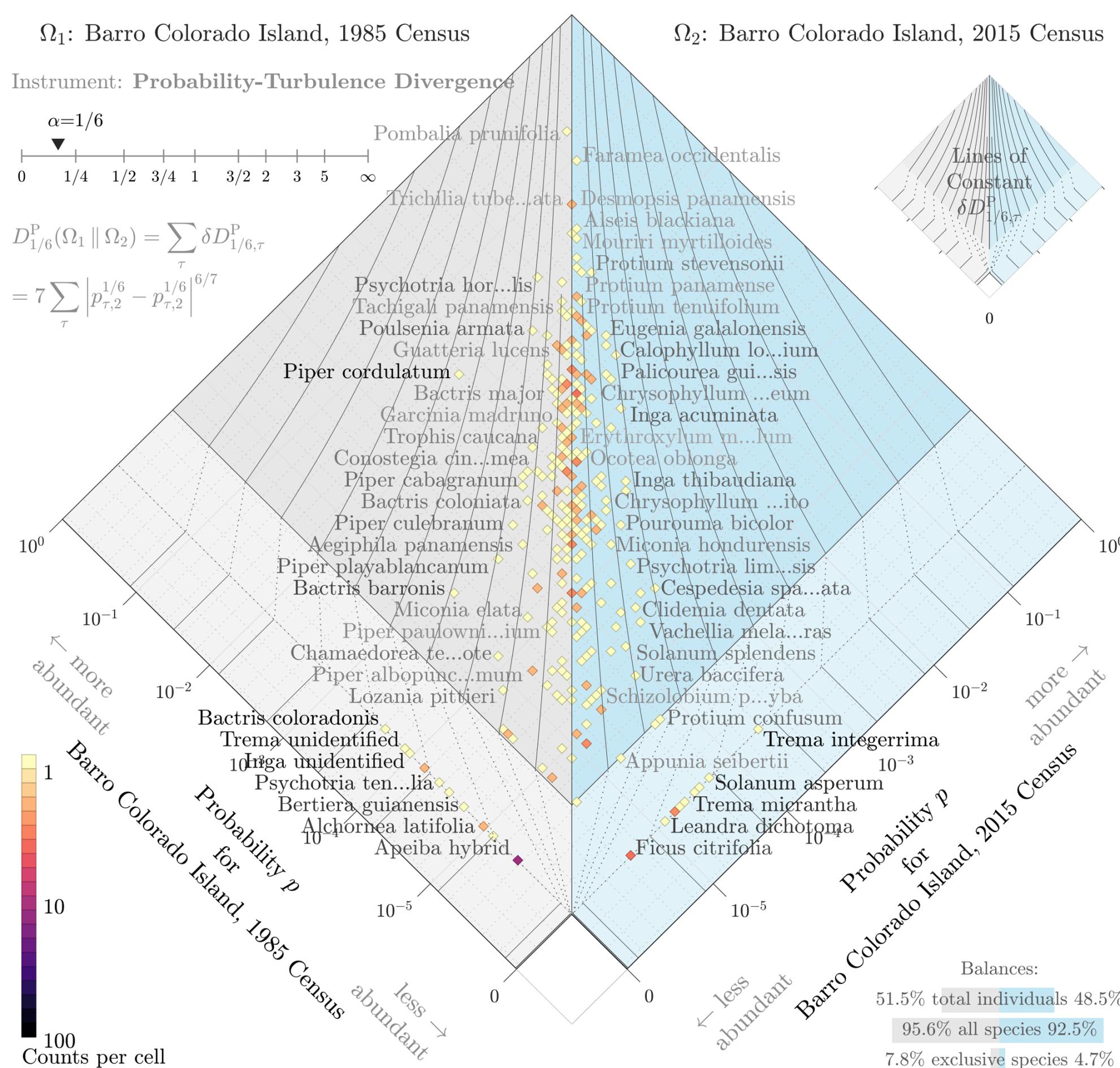
Instrument: **Probability-Turbulence Divergence**

$\alpha=1/6$



$$D_{1/6}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{1/6,\tau}^P$$

$$= 7 \sum_{\tau} \left| p_{\tau,2}^{1/6} - p_{\tau,1}^{1/6} \right|^{6/7}$$



Divergence contribution  $\delta D_{1/6,\tau}^P$  (%)



$\triangleleft$ Bactris coloradonis	185 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 195
$\triangleright$ Trema integerrima	
Piper cordulatum	9 $\rightleftharpoons$ 138
$\triangleleft$ Trema unidentified	209 $\rightleftharpoons$ 308
$\triangleleft$ Inga unidentified	215 $\rightleftharpoons$ 308
$\triangleleft$ Geonoma interrupta	228 $\rightleftharpoons$ 308
$\triangleleft$ Koanophyllon wetmorei	231 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 240
$\triangleright$ Solanum asperum	
$\triangleleft$ Psychotria tenuifolia	241 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 246
$\triangleright$ Cecropia longipes	
	313 $\rightleftharpoons$ 250
$\triangleright$ Miconia dorsiloba	
$\triangleleft$ Cyathea petiolata	255 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 259
$\triangleright$ Trema micrantha	
	313 $\rightleftharpoons$ 262
$\triangleright$ Jacaratia spinosa	
$\triangleleft$ Bertiera guianensis	266 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 269
$\triangleright$ Ficus pertusa	
	313 $\rightleftharpoons$ 269
$\triangleright$ Miconia prasina	
	313 $\rightleftharpoons$ 269
$\triangleright$ Cestrum racemosum	
	313 $\rightleftharpoons$ 278
$\triangleright$ Leandra dichotoma	
$\triangleleft$ Alchornea latifolia	277 $\rightleftharpoons$ 308
$\triangleleft$ Pavonia dasypetala	277 $\rightleftharpoons$ 308
$\triangleleft$ Annona hayesii	286 $\rightleftharpoons$ 308
Bactris barronis	137 $\rightleftharpoons$ 269
	313 $\rightleftharpoons$ 290
$\triangleright$ Ficus citrifolia	
	313 $\rightleftharpoons$ 290
$\triangleright$ Piper longispicum	
	313 $\rightleftharpoons$ 290
$\triangleright$ Rauvolfia littoralis	
	313 $\rightleftharpoons$ 290
$\triangleright$ Verbesina gigantea	
$\triangleleft$ Apeiba hybrid	298 $\rightleftharpoons$ 308
$\triangleleft$ Ficus colubrinae	298 $\rightleftharpoons$ 308
$\triangleleft$ Inga mucuna	298 $\rightleftharpoons$ 308
$\triangleleft$ Lycianthes maxonii	298 $\rightleftharpoons$ 308
$\triangleleft$ Solanum arboreum	298 $\rightleftharpoons$ 308
$\triangleleft$ Ternstroemia tepezapote	298 $\rightleftharpoons$ 308
$\triangleleft$ Vismia macrophylla	298 $\rightleftharpoons$ 308
$\triangleleft$ Xylosma chlorantha	298 $\rightleftharpoons$ 308
$\triangleleft$ Zanthoxylum setulosum	298 $\rightleftharpoons$ 308
$\triangleleft$ Nectandra sp.4_(tin...af)	298 $\rightleftharpoons$ 308
$\triangleleft$ Schefflera morototoni	298 $\rightleftharpoons$ 308
$\triangleleft$ Ficus matiziana	298 $\rightleftharpoons$ 308
$\triangleleft$ Alibertia patinoi	298 $\rightleftharpoons$ 308

Balances:

51.5% total individuals 48.5%

95.6% all species 92.5%

7.8% exclusive species 4.7%

53.9%—46.1%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{1/4,\tau}^P$  (%)

1.5 1 0.5 0 0.5 1 1.5

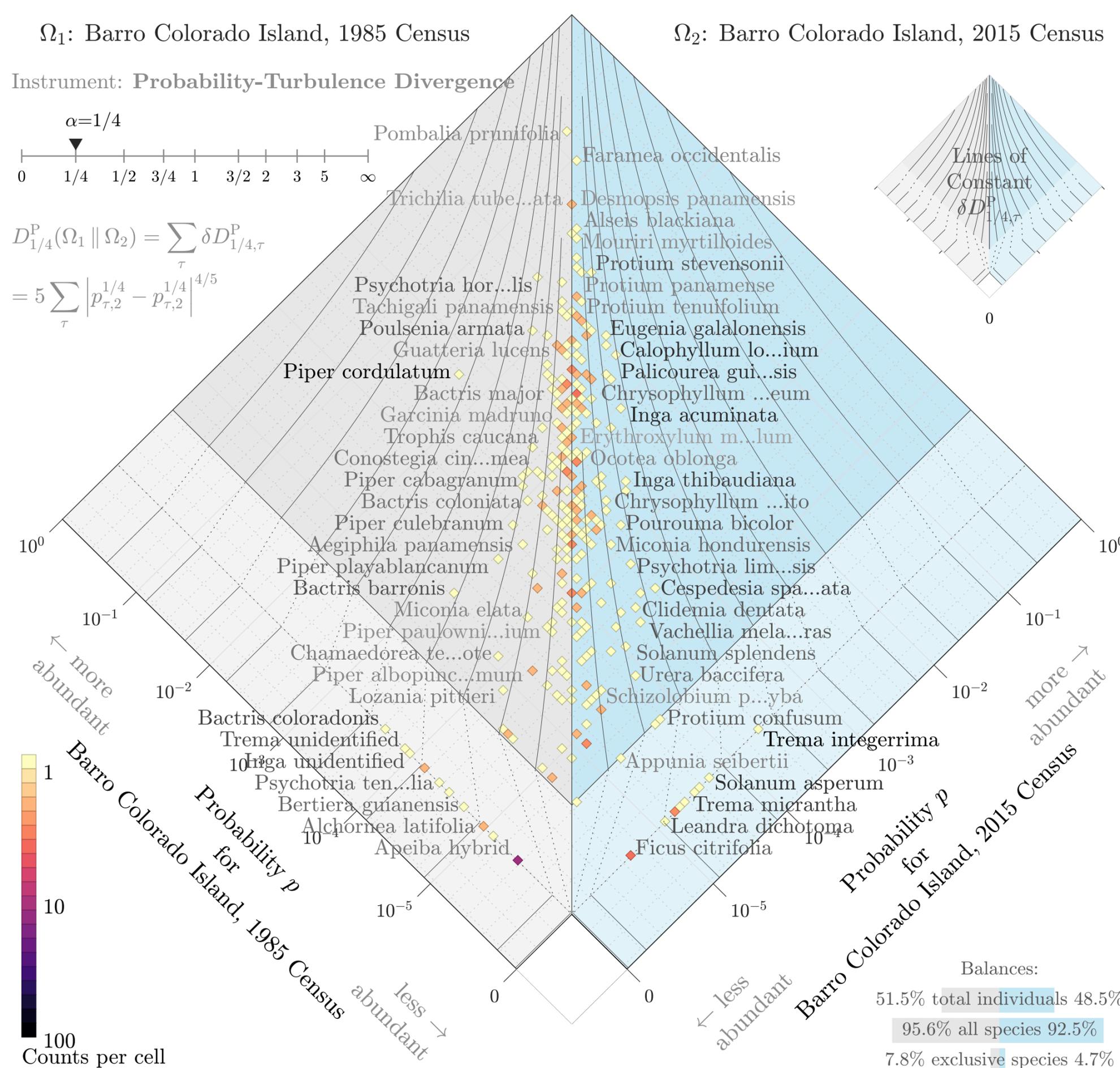
Instrument: Probability-Turbulence Divergence

$\alpha=1/4$



$$D_{1/4}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{1/4,\tau}^P$$

$$= 5 \sum_{\tau} \left| p_{\tau,2}^{1/4} - p_{\tau,1}^{1/4} \right|^{4/5}$$



Piper cordulatum	9 $\rightleftharpoons$ 138
◁Bactris coloradonis	185 $\rightleftharpoons$ 308
	313 $\rightleftharpoons$ 195
Trema integerrima	▷
◁Trema unidentified	209 $\rightleftharpoons$ 308
◁Inga unidentified	215 $\rightleftharpoons$ 308
Bactris barronis	137 $\rightleftharpoons$ 269
Poulsenia armata	14 $\rightleftharpoons$ 53
◁Geonoma interrupta	228 $\rightleftharpoons$ 308
Psychotria horizontalis	8 $\rightleftharpoons$ 23
◁Koanophyllon wetmorei	231 $\rightleftharpoons$ 308
	121 $\rightleftharpoons$ 45
Inga acuminata	
	65 $\rightleftharpoons$ 22
Calophyllum longifolium	
	313 $\rightleftharpoons$ 240
Solanum asperum	▷
◁Psychotria tenuifolia	241 $\rightleftharpoons$ 308
	93 $\rightleftharpoons$ 33
Palicourea guianensis	
	313 $\rightleftharpoons$ 246
Cecropia longipes	▷
	313 $\rightleftharpoons$ 250
Miconia dorsiloba	▷
◁Cyathea petiolata	255 $\rightleftharpoons$ 308
Piper playablancanum	140 $\rightleftharpoons$ 236
	313 $\rightleftharpoons$ 259
Trema micrantha	▷
	46 $\rightleftharpoons$ 16
Eugenia galalonensis	
	54 $\rightleftharpoons$ 25
Xylopia macrantha	
	250 $\rightleftharpoons$ 151
Cespedesia spathulata	
	180 $\rightleftharpoons$ 94
Inga thibaudiana	
	313 $\rightleftharpoons$ 262
Jacaratia spinosa	▷
◁Bertiera guianensis	266 $\rightleftharpoons$ 308
Piper culebratum	123 $\rightleftharpoons$ 213
	185 $\rightleftharpoons$ 100
Cecropia obtusifolia	
	313 $\rightleftharpoons$ 269
Ficus pertusa	▷
	313 $\rightleftharpoons$ 269
Miconia prasina	▷
	313 $\rightleftharpoons$ 269
Cestrum racemosum	▷
	83 $\rightleftharpoons$ 35
Cecropia insignis	
	127 $\rightleftharpoons$ 65
Chamguava schippii	
Piper cabagranum	98 $\rightleftharpoons$ 170
Erythrina costaricensis	103 $\rightleftharpoons$ 178
	313 $\rightleftharpoons$ 278
Leandra dichotoma	▷
	97 $\rightleftharpoons$ 165
Xylosma oligandra	
◁Alchornea latifolia	277 $\rightleftharpoons$ 308
◁Pavonia dasypetala	277 $\rightleftharpoons$ 308
	245 $\rightleftharpoons$ 168
Psychotria graciliflora	

Balances:

51.5% total individuals 48.5%

95.6% all species 92.5%

7.8% exclusive species 4.7%

51.7%—48.3%



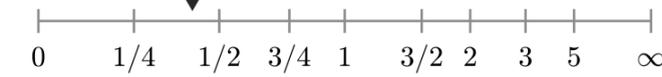
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{5/12,\tau}^P$  (%)

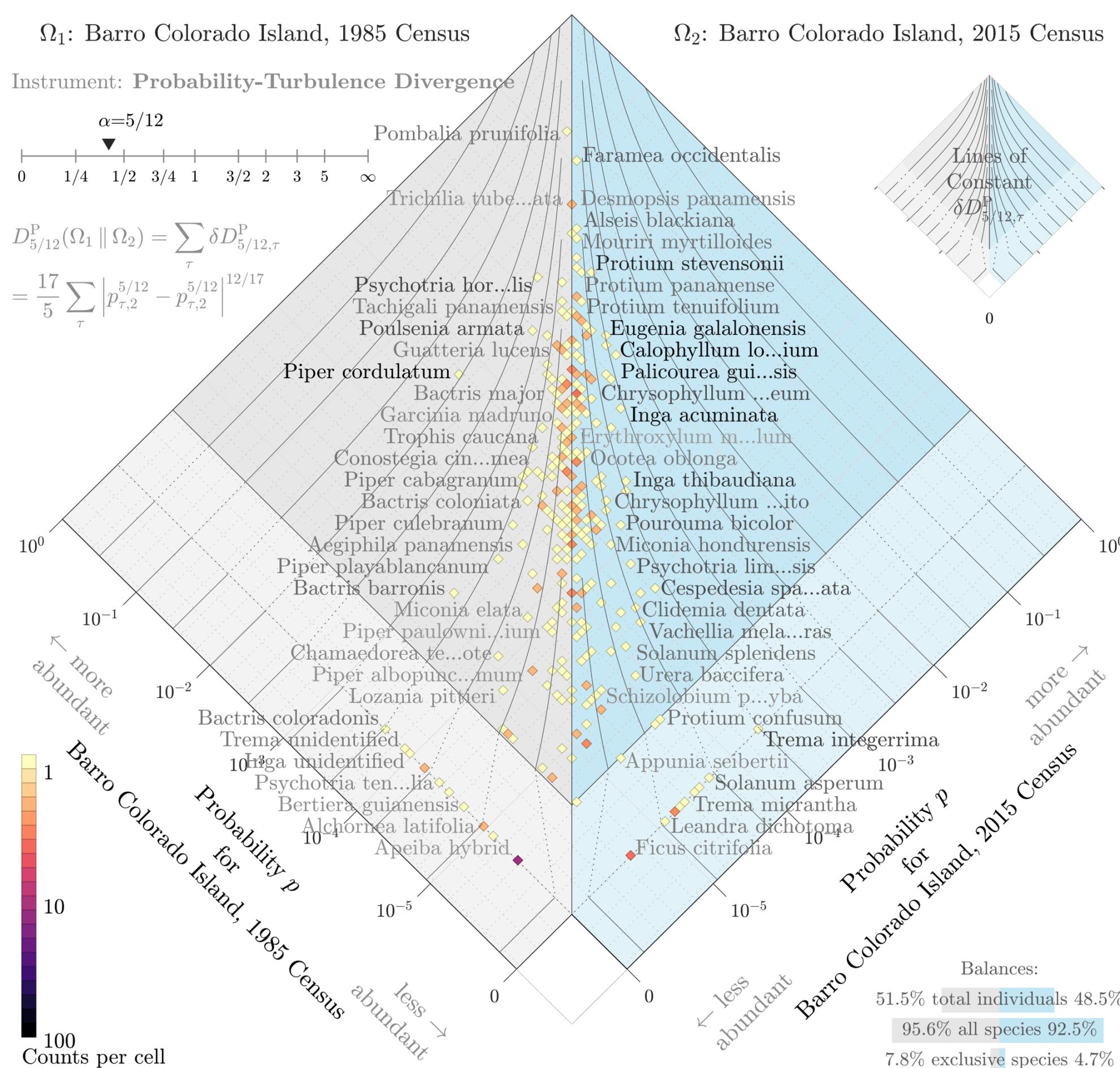
Instrument: **Probability-Turbulence Divergence**

$\alpha=5/12$



$$D_{5/12}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{5/12,\tau}^P$$

$$= \frac{17}{5} \sum_{\tau} \left| p_{\tau,2}^{5/12} - p_{\tau,2}^{5/12} \right|^{12/17}$$



Piper cordulatum	9 $\rightleftharpoons$ 138
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Poulsenia armata	14 $\rightleftharpoons$ 53
Calophyllum longifolium	65 $\rightleftharpoons$ 22
Inga acuminata	121 $\rightleftharpoons$ 45
Palicourea guianensis	93 $\rightleftharpoons$ 33
Eugenia galalonensis	46 $\rightleftharpoons$ 16
Xylopia macrantha	54 $\rightleftharpoons$ 25
Cecropia insignis	83 $\rightleftharpoons$ 35
Protium stevensonii	16 $\rightleftharpoons$ 9
Bactris barronis	137 $\rightleftharpoons$ 269
Cupania seemannii	39 $\rightleftharpoons$ 17
Virola sebifera	22 $\rightleftharpoons$ 40
Guarea bullata	34 $\rightleftharpoons$ 70
Chamguava schippii	127 $\rightleftharpoons$ 65
Inga thibaudiana	180 $\rightleftharpoons$ 94
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Pombalia prunifolia	1 $\rightleftharpoons$ 1
Cecropia obtusifolia	185 $\rightleftharpoons$ 100
Garcinia recondita	13 $\rightleftharpoons$ 10
Bactris coloradonis	185 $\rightleftharpoons$ 308
Piper cabagranum	98 $\rightleftharpoons$ 170
Trema integerrima	313 $\rightleftharpoons$ 195
Xylosma oligandra	97 $\rightleftharpoons$ 165
Erythrina costaricensis	103 $\rightleftharpoons$ 178
Piper playablancanum	140 $\rightleftharpoons$ 236
Piper culebranum	123 $\rightleftharpoons$ 213
Conostegia cinnamomea	85 $\rightleftharpoons$ 135
Anaxagorea panamensis	78 $\rightleftharpoons$ 43
Cespedesia spathulata	250 $\rightleftharpoons$ 151
Ocotea whitei	44 $\rightleftharpoons$ 81
Coussarea curvigemma	31 $\rightleftharpoons$ 18
Bactris coloniata	116 $\rightleftharpoons$ 188
Chrysophyllum argenteum	89 $\rightleftharpoons$ 57
Trema unidentified	209 $\rightleftharpoons$ 308
Trophis caucana	77 $\rightleftharpoons$ 111
Bactris major	48 $\rightleftharpoons$ 86
Guatteria lucens	29 $\rightleftharpoons$ 50
Simarouba amara	41 $\rightleftharpoons$ 31
Cestrum schlechtendalii	101 $\rightleftharpoons$ 148

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

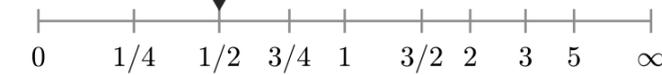
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{1/2,\tau}^P$  (%)

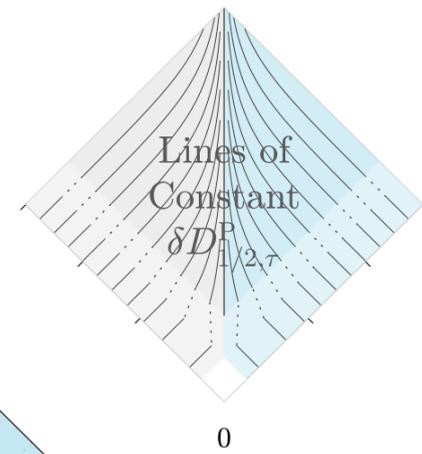
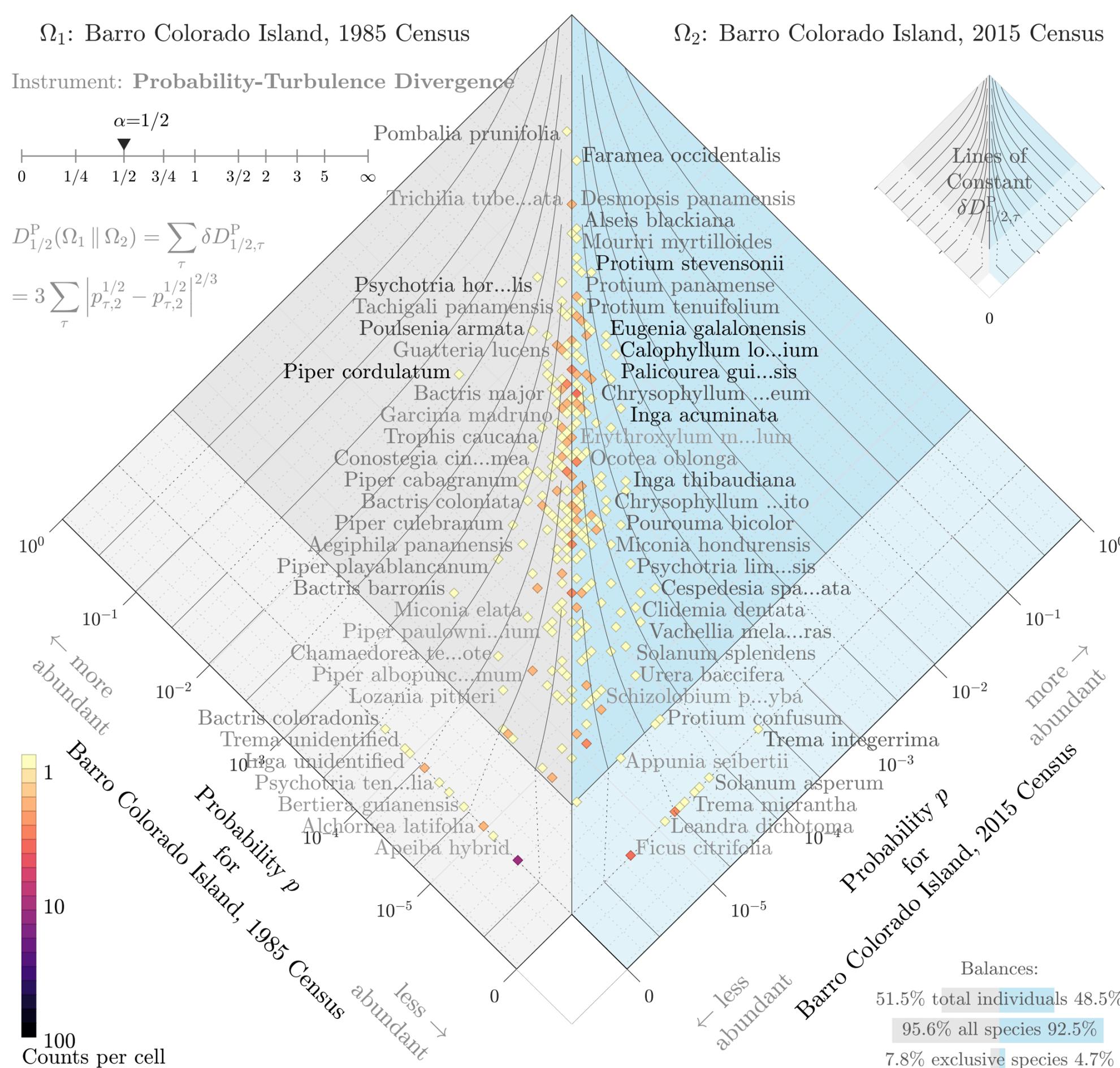
Instrument: **Probability-Turbulence Divergence**

$\alpha=1/2$



$$D_{1/2}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{1/2,\tau}^P$$

$$= 3 \sum_{\tau} \left| p_{\tau,2}^{1/2} - p_{\tau,1}^{1/2} \right|^{2/3}$$



Divergence contribution $\delta D_{1/2,\tau}^P$ (%)	
2	1.5 1 0.5 0 0.5 1 1.5 2
Piper cordulatum	9 $\rightleftharpoons$ 138
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Poulsenia armata	14 $\rightleftharpoons$ 53
Calophyllum longifolium	65 $\rightleftharpoons$ 22
Eugenia galalonensis	46 $\rightleftharpoons$ 16
Xylopia macrantha	54 $\rightleftharpoons$ 25
Palicourea guianensis	93 $\rightleftharpoons$ 33
Inga acuminata	121 $\rightleftharpoons$ 45
Protium stevensonii	16 $\rightleftharpoons$ 9
Pombalia prunifolia	1 $\rightleftharpoons$ 1
Cecropia insignis	83 $\rightleftharpoons$ 35
Cupania seemannii	39 $\rightleftharpoons$ 17
Virola sebifera	22 $\rightleftharpoons$ 40
Guarea bullata	34 $\rightleftharpoons$ 70
Garcinia recondita	13 $\rightleftharpoons$ 10
Chamguava schippii	127 $\rightleftharpoons$ 65
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Bactris barronis	137 $\rightleftharpoons$ 269
Inga thibaudiana	180 $\rightleftharpoons$ 94
Anaxagorea panamensis	78 $\rightleftharpoons$ 43
Coussarea curvigemma	31 $\rightleftharpoons$ 18
Cecropia obtusifolia	185 $\rightleftharpoons$ 100
Faramea occidentalis	2 $\rightleftharpoons$ 2
Piper cabagranum	98 $\rightleftharpoons$ 170
Ocotea whitei	44 $\rightleftharpoons$ 81
Xylosma oligandra	97 $\rightleftharpoons$ 165
Erythrina costaricensis	103 $\rightleftharpoons$ 178
Conostegia cinnamomea	85 $\rightleftharpoons$ 135
Swartzia simplex	10 $\rightleftharpoons$ 8
Capparidastrium frondosum	12 $\rightleftharpoons$ 15
Piper culebranum	123 $\rightleftharpoons$ 213
Simarouba amara	41 $\rightleftharpoons$ 31
Guatteria lucens	29 $\rightleftharpoons$ 50
Tachigali panamensis	17 $\rightleftharpoons$ 30
Tabernaemontana arborea	38 $\rightleftharpoons$ 29
Piper playablancanum	140 $\rightleftharpoons$ 236
Chrysophyllum argenteum	89 $\rightleftharpoons$ 57
Bactris major	48 $\rightleftharpoons$ 86
Psychotria marginata	74 $\rightleftharpoons$ 49
Sorocea affinis	15 $\rightleftharpoons$ 19
Balances:	
51.5% total individuals	48.5%
95.6% all species	92.5%
7.8% exclusive species	4.7%
48.8%—51.2%	

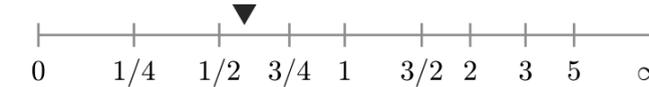
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{7/12,\tau}^P$  (%)

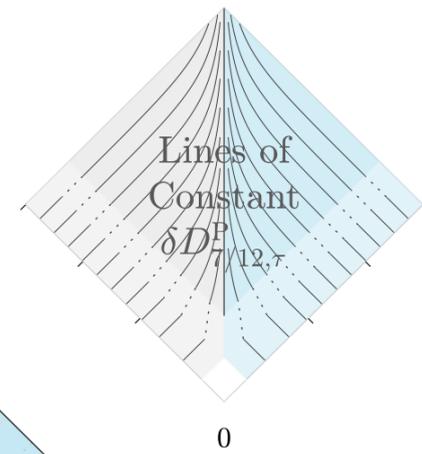
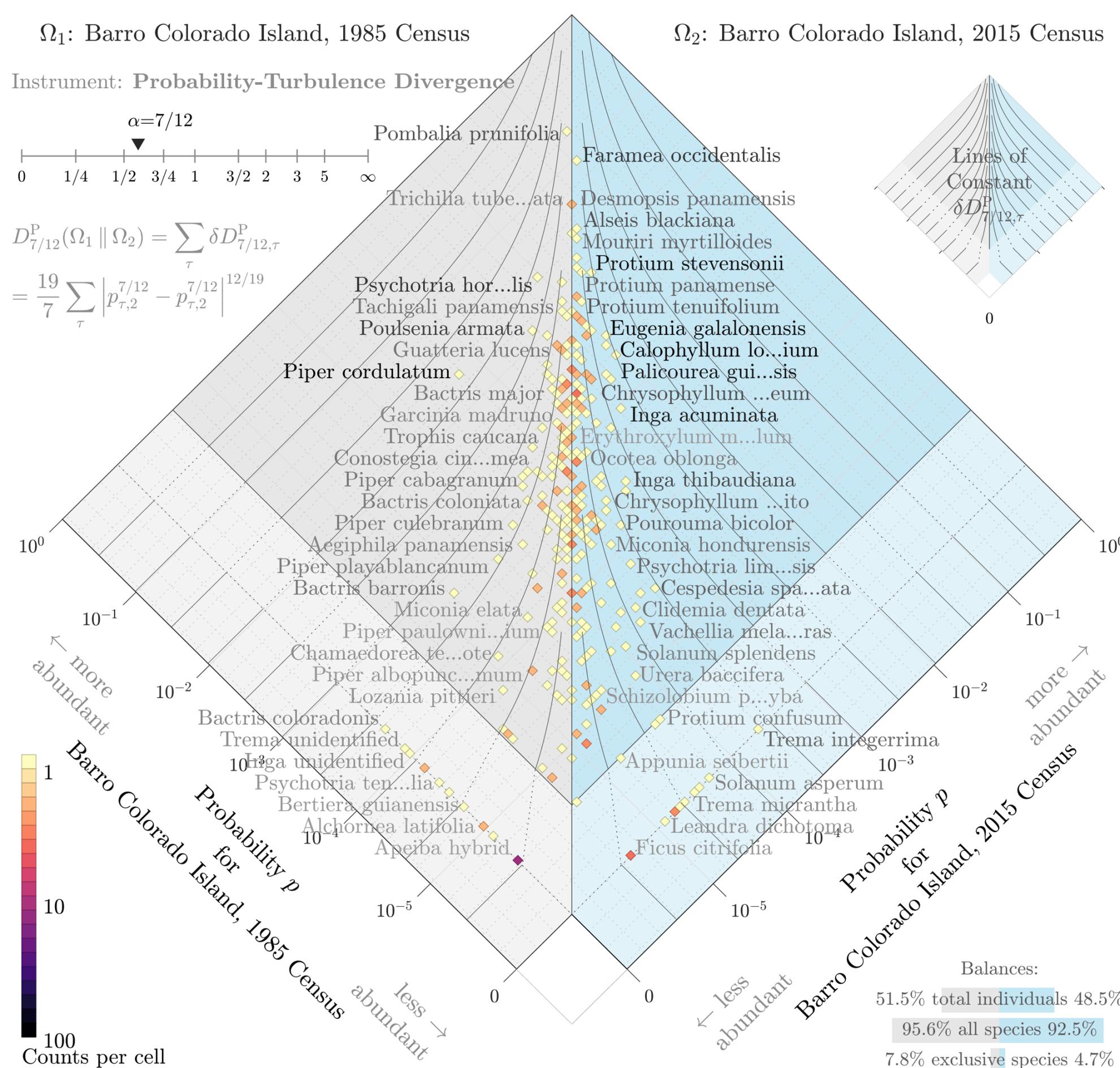
Instrument: **Probability-Turbulence Divergence**

$\alpha=7/12$



$$D_{7/12}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{7/12,\tau}^P$$

$$= \frac{19}{7} \sum_{\tau} \left| p_{\tau,2}^{7/12} - p_{\tau,2}^{7/12} \right|^{12/19}$$



	2	1.5	1	0.5	0	0.5	1	1.5	2
Piper cordulatum	9	⇒	138						
Psychotria horizontalis	8	⇒	23						
Poulsenia armata	14	⇒	53						
Calophyllum longifolium	65	⇒	22						
Pombalia prunifolia	1	⇒	1						
Eugenia galalonensis	46	⇒	16						
Protium stevensonii	16	⇒	9						
Xylopia macrantha	54	⇒	25						
Palicourea guianensis	93	⇒	33						
Inga acuminata	121	⇒	45						
Cupania seemannii	39	⇒	17						
Cecropia insignis	83	⇒	35						
Virola sebifera	22	⇒	40						
Garcinia reconcita	13	⇒	10						
Guarea bullata	34	⇒	70						
Faramea occidentalis	2	⇒	2						
Hasseltia floribunda	37	⇒	77						
Chamguava schippii	127	⇒	65						
Coussarea curvigemma	31	⇒	18						
Swartzia simplex	10	⇒	8						
Capparidastrium frondosum	12	⇒	15						
Anaxagorea panamensis	78	⇒	43						
Ocotea whitei	44	⇒	81						
Inga thibaudiana	180	⇒	94						
Tachigali panamensis	17	⇒	30						
Simarouba amara	41	⇒	31						
Tabernaemontana arborea	38	⇒	29						
Guatteria lucens	29	⇒	50						
Sorocea affinis	15	⇒	19						
Bactris barronis	137	⇒	269						
Cecropia obtusifolia	185	⇒	100						
Piper cabagranum	98	⇒	170						
Conostegia cinnamomea	85	⇒	135						
Xylosma oligandra	97	⇒	165						
Chrysophyllum argenteum	89	⇒	57						
Bactris major	48	⇒	86						
Erythrina costaricensis	103	⇒	178						
Alseis blackiana	6	⇒	5						
Psychotria marginata	74	⇒	49						
Pouteria reticulata	30	⇒	48						

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

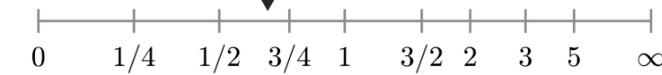
48.3%—51.7%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

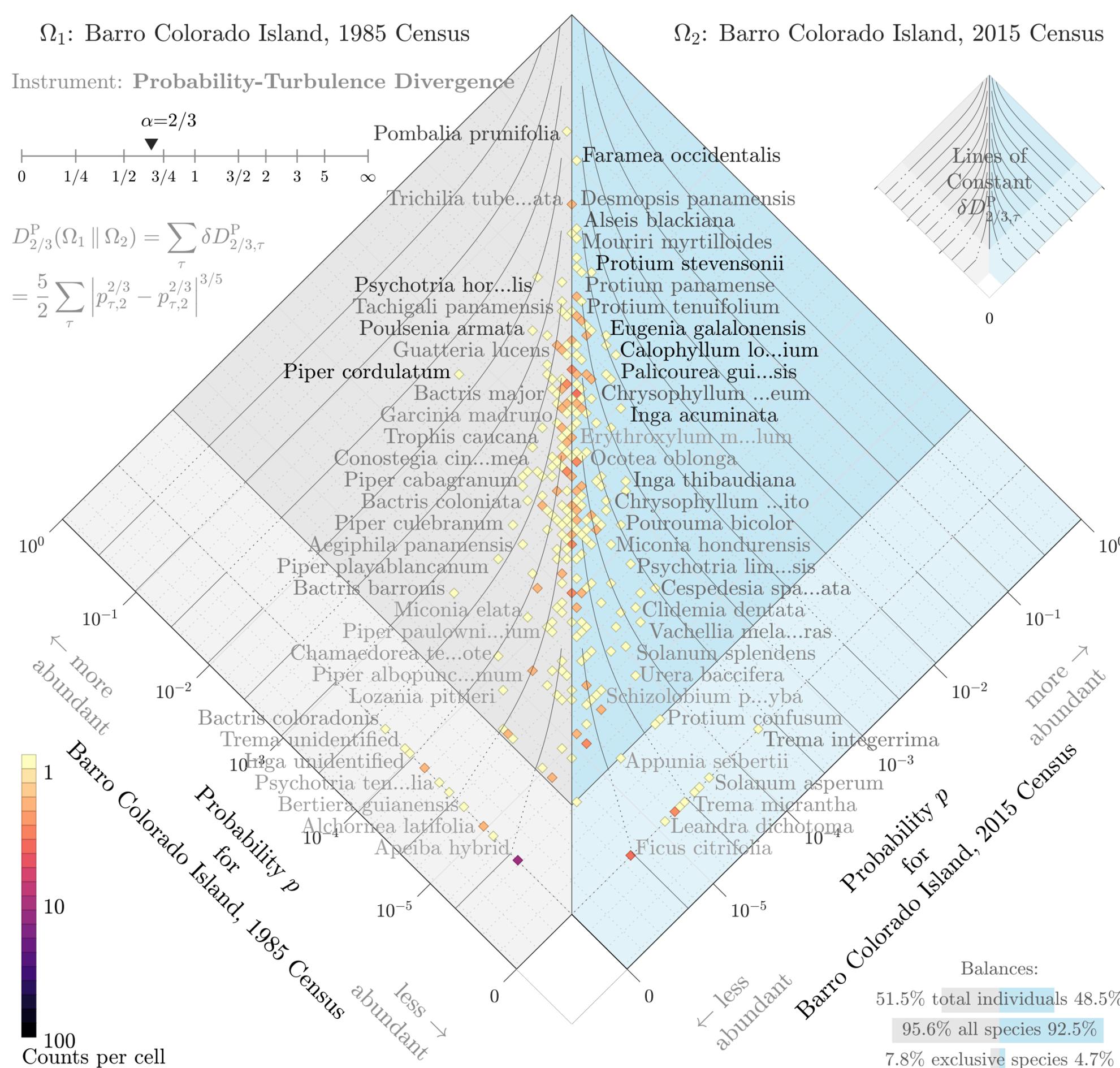
Instrument: **Probability-Turbulence Divergence**

$\alpha=2/3$



$$D_{2/3}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{2/3,\tau}^P$$

$$= \frac{5}{2} \sum_{\tau} \left| p_{\tau,2}^{2/3} - p_{\tau,2} \right|^{3/5}$$



Divergence contribution  $\delta D_{2/3,\tau}^P$  (%)

2 1.5 1 0.5 0 0.5 1 1.5 2

Piper cordulatum	9 $\rightleftharpoons$ 138
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Poulsenia armata	14 $\rightleftharpoons$ 53
Pombalia prunifolia	1 $\rightleftharpoons$ 1
Calophyllum longifolium	65 $\rightleftharpoons$ 22
Protium stevensonii	16 $\rightleftharpoons$ 9
Eugenia galalonensis	46 $\rightleftharpoons$ 16
Xylopia macrantha	54 $\rightleftharpoons$ 25
Palicourea guianensis	93 $\rightleftharpoons$ 33
Faramea occidentalis	2 $\rightleftharpoons$ 2
Inga acuminata	121 $\rightleftharpoons$ 45
Garcinia recondita	13 $\rightleftharpoons$ 10
Cupania seemannii	39 $\rightleftharpoons$ 17
Virola sebifera	22 $\rightleftharpoons$ 40
Cecropia insignis	83 $\rightleftharpoons$ 35
Guarea bullata	34 $\rightleftharpoons$ 70
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Swartzia simplex	10 $\rightleftharpoons$ 8
Coussarea curvigemma	31 $\rightleftharpoons$ 18
Capparidastrium frondosum	12 $\rightleftharpoons$ 15
Changuava schippii	127 $\rightleftharpoons$ 65
Tachigali panamensis	17 $\rightleftharpoons$ 30
Anaxagorea panamensis	78 $\rightleftharpoons$ 43
Alseis blackiana	6 $\rightleftharpoons$ 5
Sorocea affinis	15 $\rightleftharpoons$ 19
Simarouba amara	41 $\rightleftharpoons$ 31
Tabernaemontana arborea	38 $\rightleftharpoons$ 29
Ocotea whitei	44 $\rightleftharpoons$ 81
Guatteria lucens	29 $\rightleftharpoons$ 50
Inga thibaudiana	180 $\rightleftharpoons$ 94
Protium tenuifolium	20 $\rightleftharpoons$ 13
Bactris major	48 $\rightleftharpoons$ 86
Chrysophyllum argenteum	89 $\rightleftharpoons$ 57
Psychotria marginata	74 $\rightleftharpoons$ 49
Pouteria reticulata	30 $\rightleftharpoons$ 48
Cordia lasiocalyx	28 $\rightleftharpoons$ 42
Conostegia cinnamomea	85 $\rightleftharpoons$ 135
Piper cabagranum	98 $\rightleftharpoons$ 170
Cecropia obtusifolia	185 $\rightleftharpoons$ 100
Xylosma oligandra	97 $\rightleftharpoons$ 165

Balances:

51.5% total individuals 48.5%

95.6% all species 92.5%

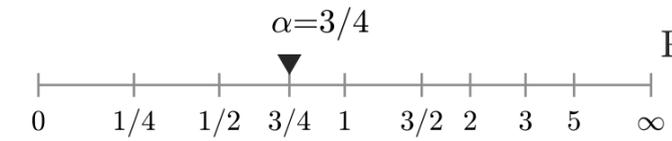
7.8% exclusive species 4.7%

47.9%—52.1%

$\Omega_1$ : Barro Colorado Island, 1985 Census

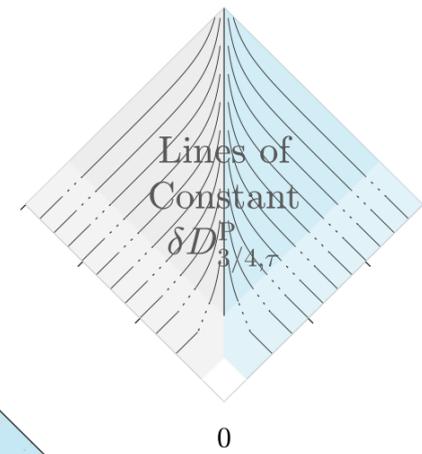
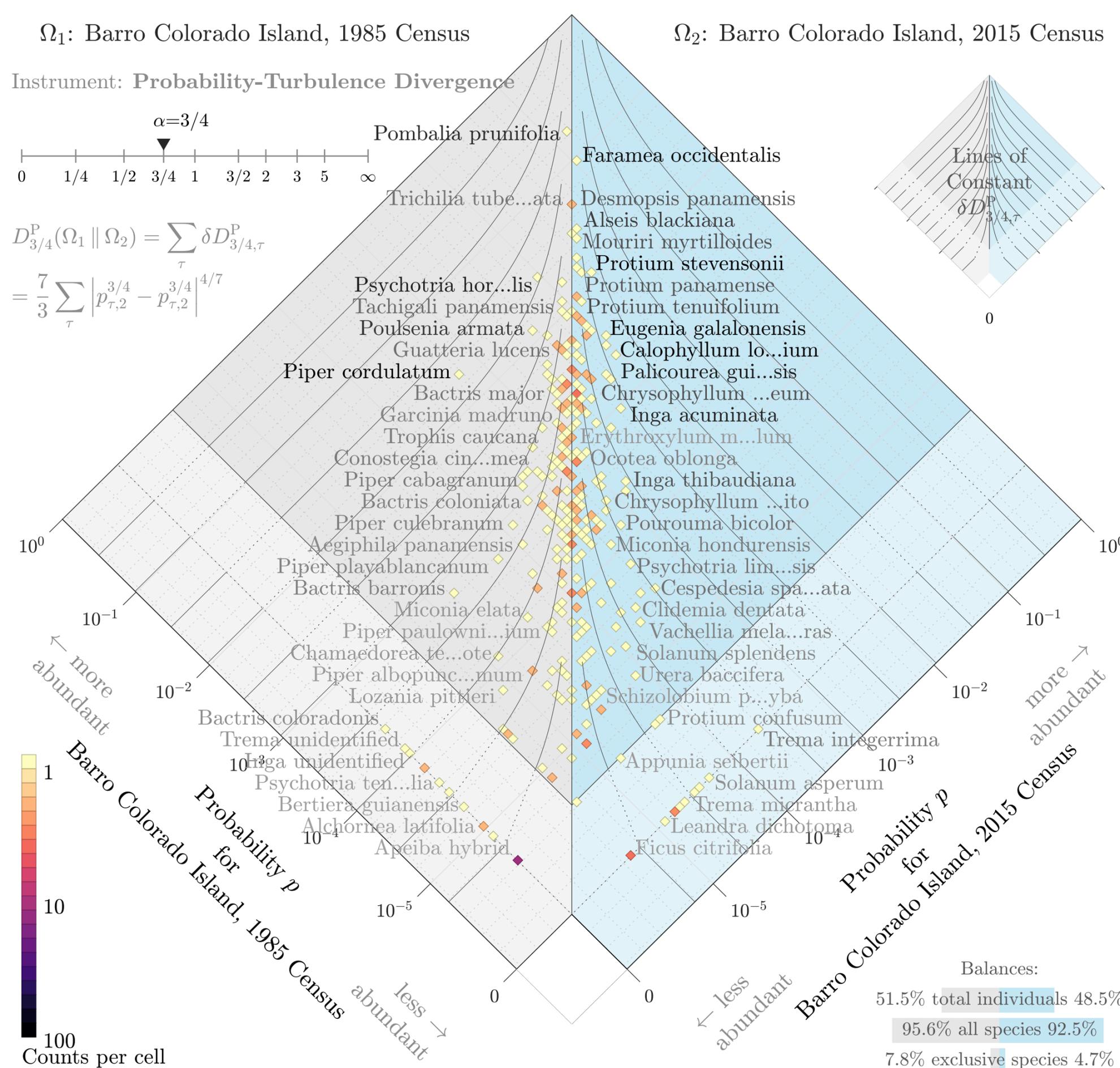
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_{3/4}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{3/4,\tau}^P$$

$$= \frac{7}{3} \sum_{\tau} \left| p_{\tau,2}^{3/4} - p_{\tau,1}^{3/4} \right|^{4/7}$$



Divergence contribution  $\delta D_{3/4,\tau}^P$  (%)



Piper cordulatum	9	⇒	138
Psychotria horizontalis	8	⇒	23
Pombalia prunifolia	1	⇒	1
Poulsenia armata	14	⇒	53
Protium stevensonii	16	⇒	9
Calophyllum longifolium	65	⇒	22
Eugenia galalonensis	46	⇒	16
Faramea occidentalis	2	⇒	2
Xylopia macrantha	54	⇒	25
Garcinia recondita	13	⇒	10
Palicourea guianensis	93	⇒	33
Cupania seemanii	39	⇒	17
Virola sebifera	22	⇒	40
Inga acuminata	121	⇒	45
Cecropia insignis	83	⇒	35
Swartzia simplex	10	⇒	8
Guarea bullata	34	⇒	70
Capparidastrum frondosum	12	⇒	15
Hasseltia floribunda	37	⇒	77
Coussarea curvigemma	31	⇒	18
Alseis blackiana	6	⇒	5
Tachigali panamensis	17	⇒	30
Sorocea affinis	15	⇒	19
Changuava schippii	127	⇒	65
Simarouba amara	41	⇒	31
Tabernaemontana arborea	38	⇒	29
Anaxagorea panamensis	78	⇒	43
Guatteria lucens	29	⇒	50
Ocotea whitei	44	⇒	81
Protium tenuifolium	20	⇒	13
Trichilia tuberculata	3	⇒	4
Pouteria reticulata	30	⇒	48
Cordia lasiocalyx	28	⇒	42
Mouriri myrtilloides	7	⇒	7
Psychotria marginata	74	⇒	49
Bactris major	48	⇒	86
Chrysophyllum argenteum	89	⇒	57
Acalypha diversifolia	26	⇒	21
Protium panamense	19	⇒	12
Inga thibaudiana	180	⇒	94

Balances:

51.5% total individuals 48.5%

95.6% all species 92.5%

7.8% exclusive species 4.7%

47.5%—52.5%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

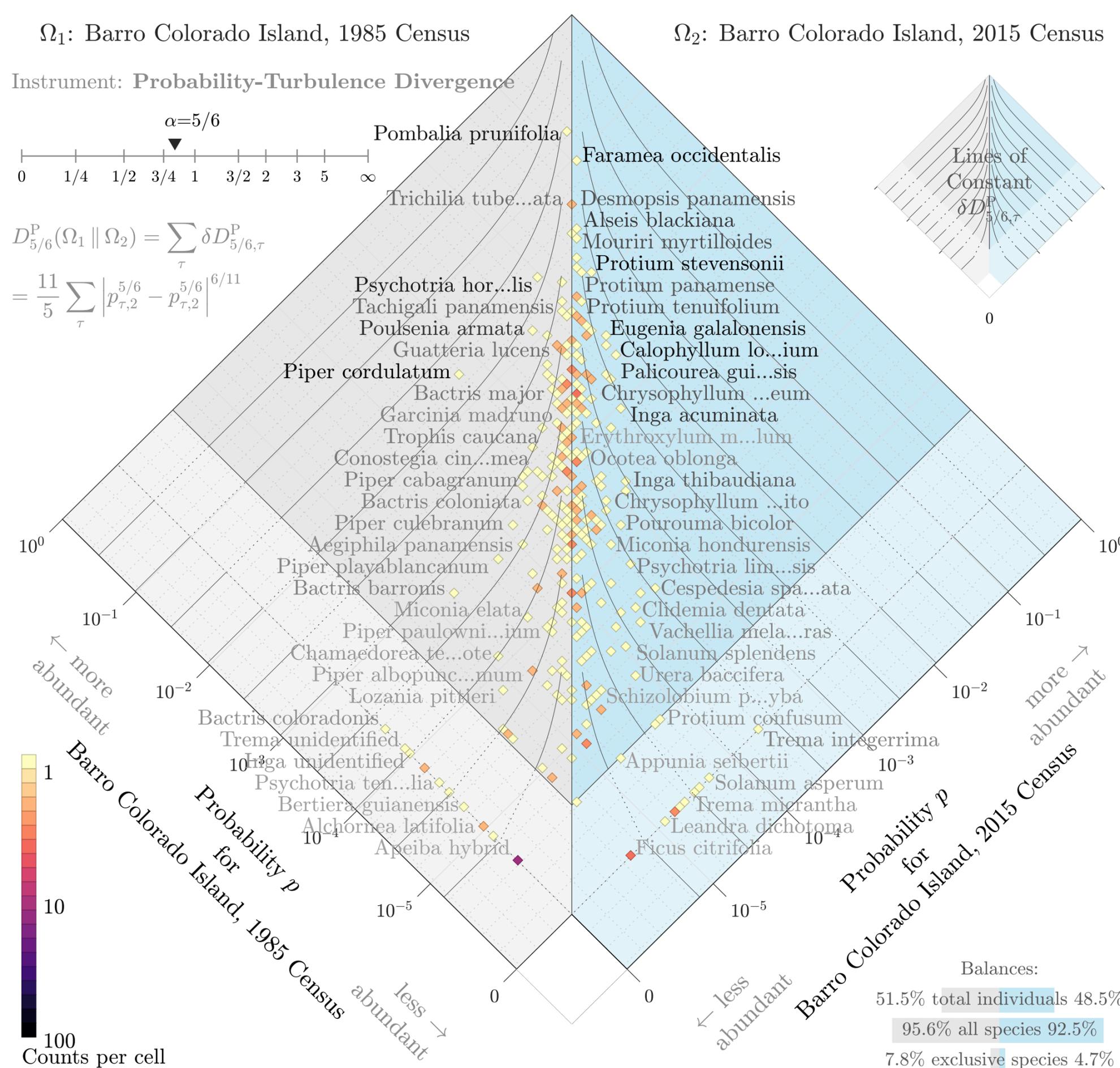
Instrument: **Probability-Turbulence Divergence**

$\alpha=5/6$



$$D_{5/6}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{5/6,\tau}^P$$

$$= \frac{11}{5} \sum_{\tau} \left| p_{\tau,2}^{5/6} - p_{\tau,2}^{5/6} \right|^{6/11}$$



Divergence contribution  $\delta D_{5/6,\tau}^P$  (%)



Piper cordulatum	9 $\rightleftharpoons$ 138
Pombalia prunifolia	1 $\rightleftharpoons$ 1
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Poulsenia armata	14 $\rightleftharpoons$ 53
Faramea occidentalis	2 $\rightleftharpoons$ 2
Protium stevensonii	16 $\rightleftharpoons$ 9
Calophyllum longifolium	65 $\rightleftharpoons$ 22
Eugenia galalonensis	46 $\rightleftharpoons$ 16
Garcinia recondita	13 $\rightleftharpoons$ 10
Xylopia macrantha	54 $\rightleftharpoons$ 25
Palicourea guianensis	93 $\rightleftharpoons$ 33
Cupania seemannii	39 $\rightleftharpoons$ 17
Virola sebifera	22 $\rightleftharpoons$ 40
Swartzia simplex	10 $\rightleftharpoons$ 8
Inga acuminata	121 $\rightleftharpoons$ 45
Cecropia insignis	83 $\rightleftharpoons$ 35
Alseis blackiana	6 $\rightleftharpoons$ 5
Capparidastrum frondosum	12 $\rightleftharpoons$ 15
Guarea bullata	34 $\rightleftharpoons$ 70
Coussarea curvigemma	31 $\rightleftharpoons$ 18
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Tachigali panamensis	17 $\rightleftharpoons$ 30
Sorocea affinis	15 $\rightleftharpoons$ 19
Trichilia tuberculata	3 $\rightleftharpoons$ 4
Simarouba amara	41 $\rightleftharpoons$ 31
Tabernaemontana arborea	38 $\rightleftharpoons$ 29
Guatteria lucens	29 $\rightleftharpoons$ 50
Protium tenuifolium	20 $\rightleftharpoons$ 13
Anaxagorea panamensis	78 $\rightleftharpoons$ 43
Changuava schippii	127 $\rightleftharpoons$ 65
Mouriri myrtilloides	7 $\rightleftharpoons$ 7
Ocotea whitei	44 $\rightleftharpoons$ 81
Desmopsis panamensis	4 $\rightleftharpoons$ 3
Pouteria reticulata	30 $\rightleftharpoons$ 48
Cordia lasiocalyx	28 $\rightleftharpoons$ 42
Acalypha diversifolia	26 $\rightleftharpoons$ 21
Protium panamense	19 $\rightleftharpoons$ 12
Psychotria marginata	74 $\rightleftharpoons$ 49
Bactris major	48 $\rightleftharpoons$ 86
Chrysophyllum argenteum	89 $\rightleftharpoons$ 57

Balances:

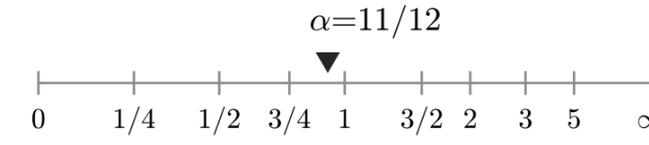
51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

47.2%—52.8%

$\Omega_1$ : Barro Colorado Island, 1985 Census

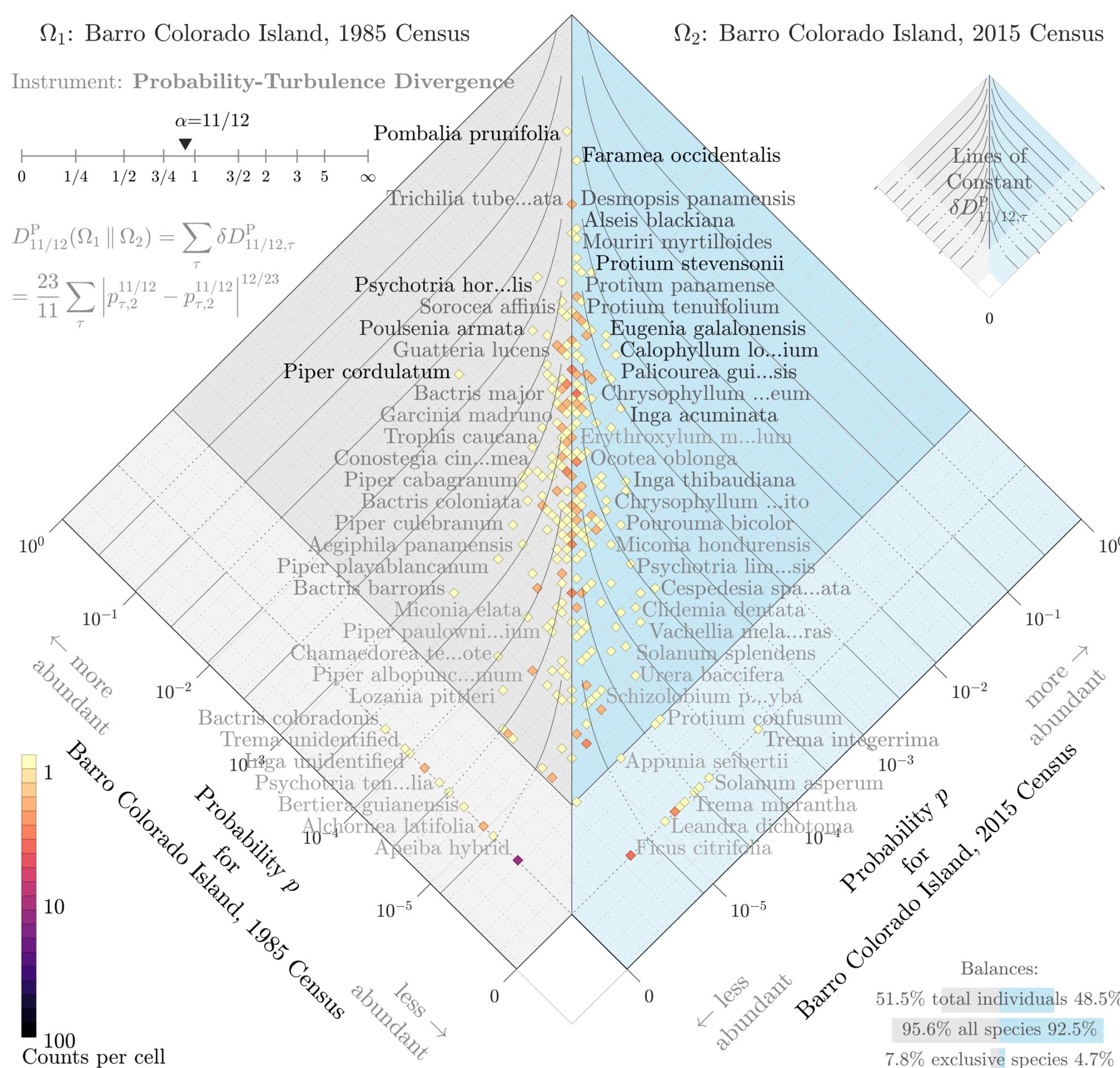
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_{11/12}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{11/12, \tau}^P$$

$$= \frac{23}{11} \sum_{\tau} \left| p_{\tau, 2}^{11/12} - p_{\tau, 2}^{12/23} \right|^{12/23}$$



Divergence contribution  $\delta D_{11/12, \tau}^P$  (%)

Species	1985	2015	Divergence Contribution (%)
Pombalia prunifolia	1	1	1.5
Piper cordulatum	9	138	1.5
Psychotria horizontalis	8	23	1.5
Faramea occidentalis	2	2	0.5
Poulsenia armata	14	53	1.5
Protium stevensonii	16	9	0.5
Calophyllum longifolium	65	22	0.5
Eugenia galalonensis	46	16	0.5
Garcinia recondita	13	10	0.5
Xylopia macrantha	54	25	0.5
Cupania seemannii	39	17	0.5
Swartzia simplex	10	8	0.5
Virola sebifera	22	40	0.5
Palicourea guianensis	93	33	0.5
Alseis blackiana	6	5	0.5
Capparidastrum frondosum	12	15	0.5
Inga acuminata	121	45	0.5
Cecropia insignis	83	35	0.5
Guarea bullata	34	70	0.5
Coussarea curvigemma	31	18	0.5
Trichilia tuberculata	3	4	0.5
Sorocea affinis	15	19	0.5
Tachigali panamensis	17	30	0.5
Hasseltia floribunda	37	77	0.5
Mouriri myrtilloides	7	7	0.5
Desmopsis panamensis	4	3	0.5
Tabernaemontana arborea	38	29	0.5
Simarouba amara	41	31	0.5
Protium tenuifolium	20	13	0.5
Anaxagorea panamensis	78	43	0.5
Ocotea whitei	44	81	0.5
Chamguava schippii	127	65	0.5
Protium panamense	19	12	0.5
Acalypha diversifolia	26	21	0.5
Hirtella triandra	11	11	0.5
Psychotria marginata	74	49	0.5
Bactris major	48	86	0.5

Balances:

51.5% total individuals 48.5%

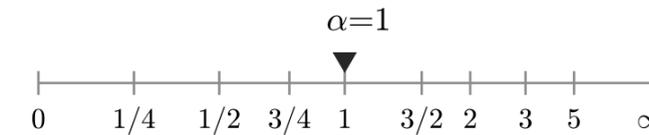
95.6% all species 92.5%

7.8% exclusive species 4.7%

$\Omega_1$ : Barro Colorado Island, 1985 Census

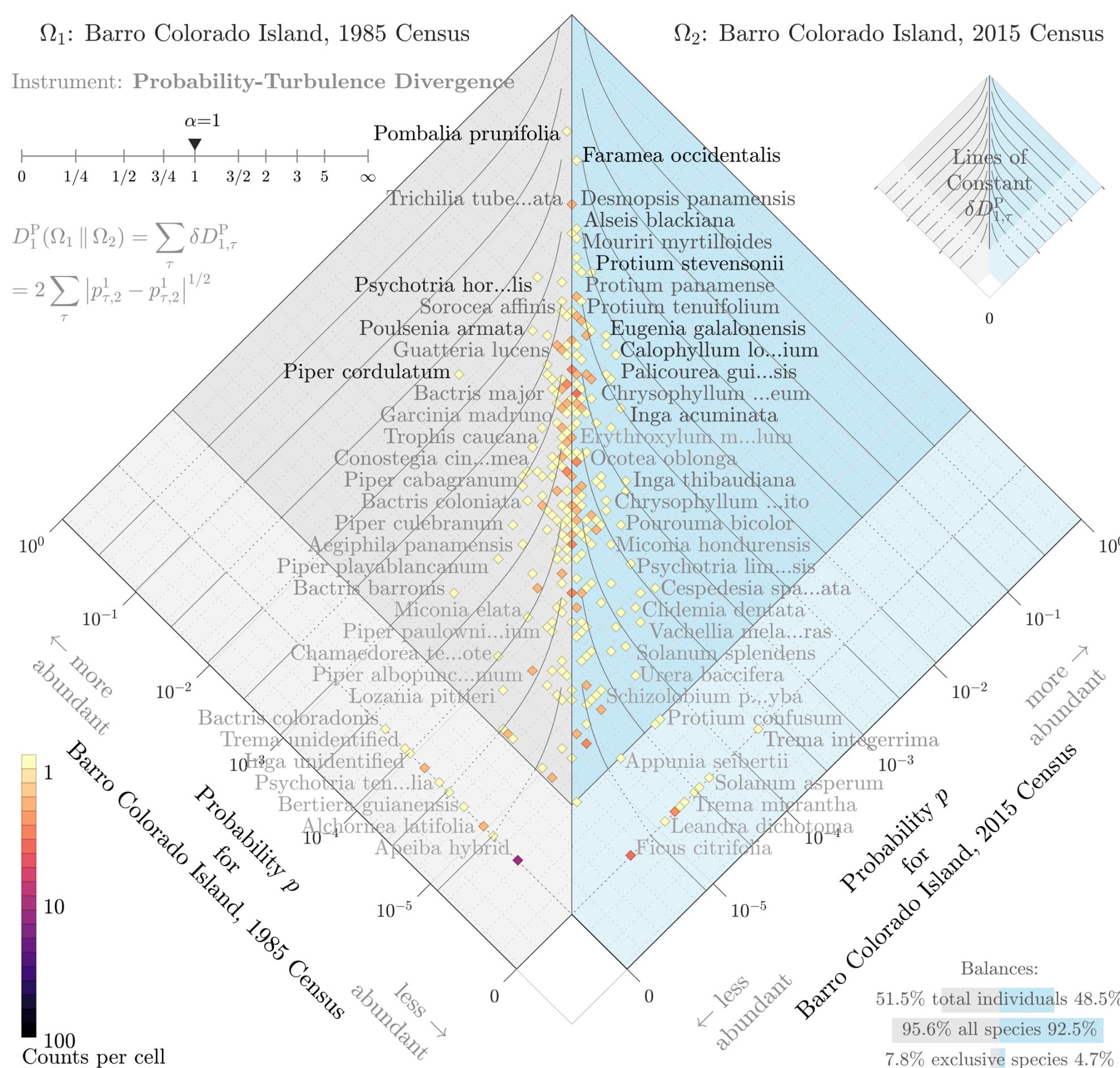
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_1^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{1,\tau}^P$$

$$= 2 \sum_{\tau} |p_{\tau,2}^1 - p_{\tau,2}^2|^{1/2}$$



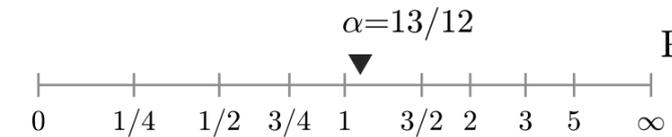
Divergence contribution  $\delta D_{1,\tau}^P$  (%)

	2	1	0	1	2
Pombalia prunifolia	1	⇒	1		
Piper cordulatum	9	⇒	138		
Psychotria horizontalis	8	⇒	23		
	2	⇒	2	Faramea occidentalis	
Poulsenia armata	14	⇒	53		
	16	⇒	9	Protium stevensonii	
	13	⇒	10	Garcinia recondita	
	65	⇒	22	Calophyllum longifolium	
	46	⇒	16	Eugenia galalonensis	
	54	⇒	25	Xylopia macrantha	
	10	⇒	8	Swartzia simplex	
	39	⇒	17	Cupania seemannii	
	6	⇒	5	Alseis blackiana	
Virola sebifera	22	⇒	40		
	93	⇒	33	Palicourea guianensis	
Capparidastrum frondosum	12	⇒	15		
Trichilia tuberculata	3	⇒	4		
	83	⇒	35	Cecropia insignis	
	121	⇒	45	Inga acuminata	
	31	⇒	18	Coussarea curvigemma	
Guarea bullata	34	⇒	70		
Sorocea affinis	15	⇒	19		
Tachigali panamensis	17	⇒	30		
	4	⇒	3	Desmopsis panamensis	
	7	⇒	7	Mouriri myrtilloides	
Hasseltia floribunda	37	⇒	77		
	20	⇒	13	Protium tenuifolium	
	38	⇒	29	Tabernaemontana arborea	
	41	⇒	31	Simarouba amara	
Guatteria lucens	29	⇒	50		
	19	⇒	12	Protium panamense	
	78	⇒	43	Anaxagorea panamensis	
	26	⇒	21	Acalypha diversifolia	
	11	⇒	11	Hirtella triandra	
Ocotea whitei	44	⇒	81		
Cordia lasiocalyx	28	⇒	42		
Pouteria reticulata	30	⇒	48		
	127	⇒	65	Chamguava schippii	
	27	⇒	24	Guarea guidonia	
	74	⇒	49	Psychotria marginata	
				46.7%—53.3%	

$\Omega_1$ : Barro Colorado Island, 1985 Census

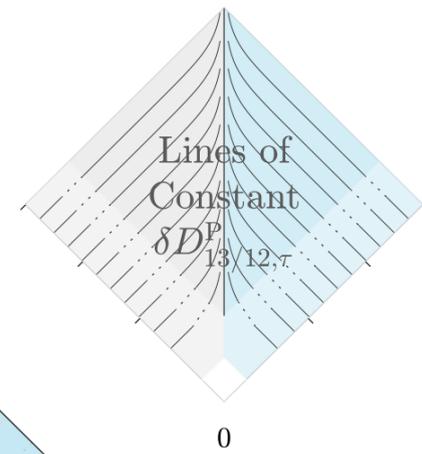
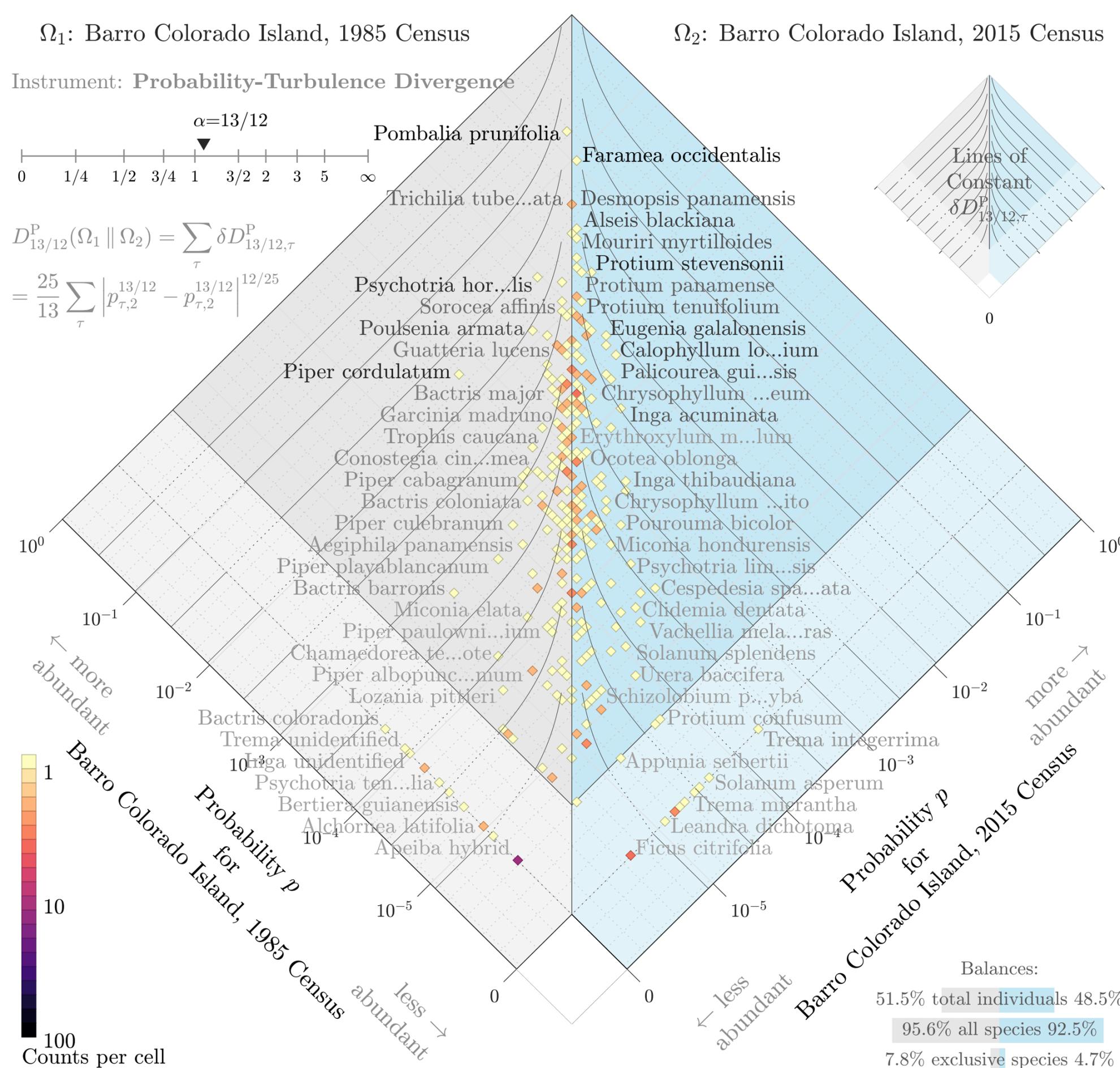
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_{13/12}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{13/12, \tau}^P$$

$$= \frac{25}{13} \sum_{\tau} \left| p_{\tau, 2}^{13/12} - p_{\tau, 2} \right|^{12/25}$$



Divergence contribution  $\delta D_{13/12, \tau}^P$  (%)

	2	1	0	1	2
Pombalia prunifolia	1	⇒	1		
Piper cordulatum	9	⇒	138		
Psychotria horizontalis	8	⇒	23		
	2	⇒	2	Faramea occidentalis	
Poulsenia armata	14	⇒	53		
	16	⇒	9	Protium stevensonii	
	13	⇒	10	Garcinia recondita	
	46	⇒	16	Eugenia galalonensis	
	65	⇒	22	Calophyllum longifolium	
	10	⇒	8	Swartzia simplex	
	54	⇒	25	Xylopia macrantha	
	6	⇒	5	Alseis blackiana	
	39	⇒	17	Cupania seemannii	
Virola sebifera	22	⇒	40		
Trichilia tuberculata	3	⇒	4		
Capparidastrum frondosum	12	⇒	15		
	93	⇒	33	Palicourea guianensis	
	4	⇒	3	Desmopsis panamensis	
	7	⇒	7	Mouriri myrtilloides	
	31	⇒	18	Coussarea curvigemma	
Sorocea affinis	15	⇒	19		
	83	⇒	35	Cecropia insignis	
Tachigali panamensis	17	⇒	30		
Guarea bullata	34	⇒	70		
	121	⇒	45	Inga acuminata	
	20	⇒	13	Protium tenuifolium	
Hasseltia floribunda	37	⇒	77		
	38	⇒	29	Tabernaemontana arborea	
	41	⇒	31	Simarouba amara	
Guatteria lucens	29	⇒	50		
	19	⇒	12	Protium panamense	
	11	⇒	11	Hirtella triandra	
	26	⇒	21	Acalypha diversifolia	
	78	⇒	43	Anaxagorea panamensis	
Cordia lasiocalyx	28	⇒	42		
Pouteria reticulata	30	⇒	48		
Ocotea whitei	44	⇒	81		
	27	⇒	24	Guarea guidonia	
	127	⇒	65	Chamguava schippii	
	74	⇒	49	Psychotria marginata	
				46.5%—53.5%	

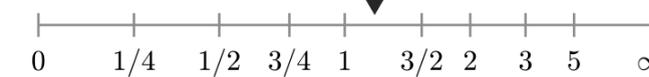
Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

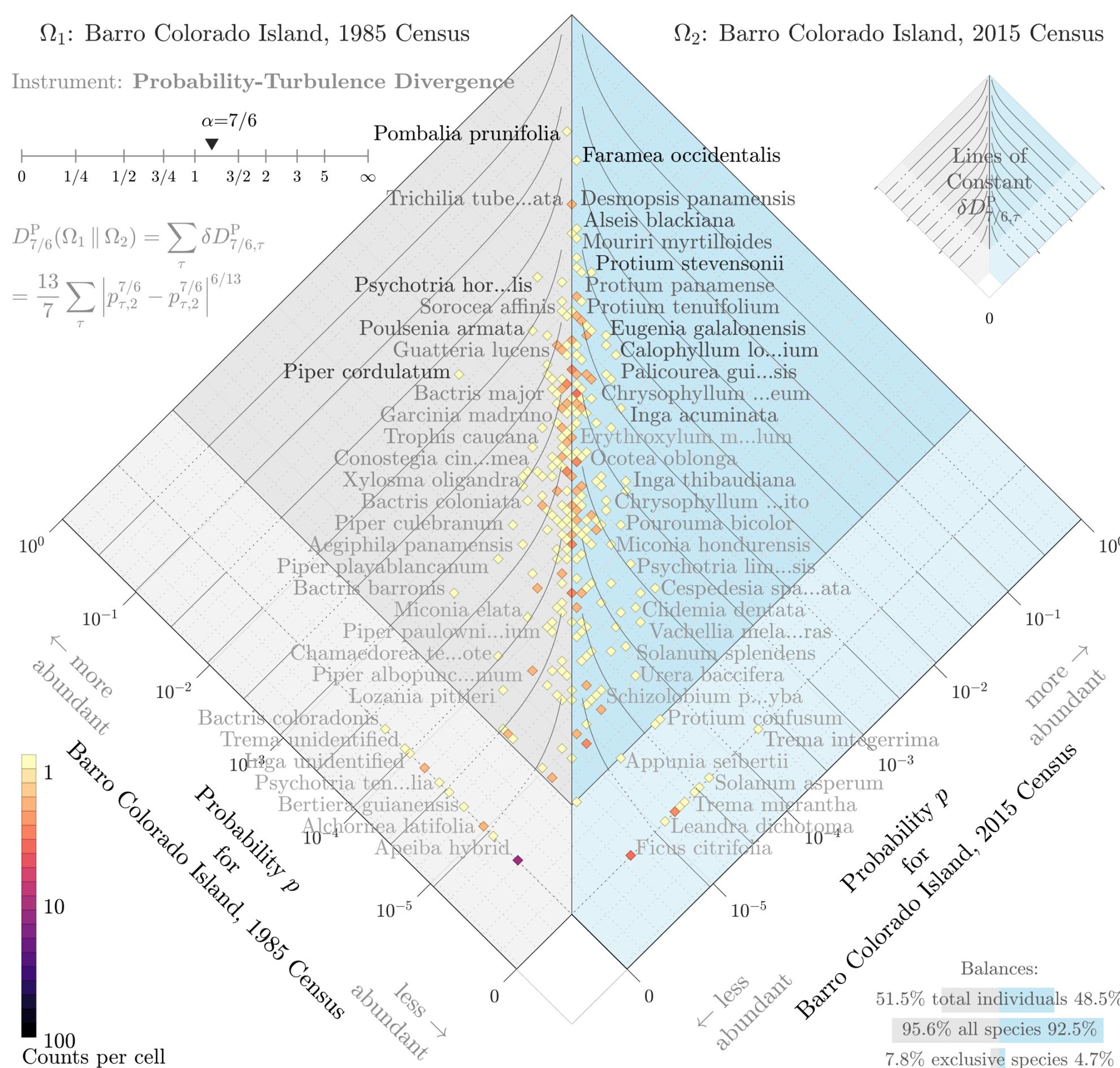
Instrument: **Probability-Turbulence Divergence**

$\alpha=7/6$



$$D_{7/6}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{7/6,\tau}^P$$

$$= \frac{13}{7} \sum_{\tau} \left| p_{\tau,2}^{7/6} - p_{\tau,1}^{7/6} \right|^{6/13}$$



Divergence contribution  $\delta D_{7/6,\tau}^P$  (%)

	3	2	1	0	1	2	3
Pombalia prunifolia				1	1		
Piper cordulatum				9	138		
Psychotria horizontalis				2	2		
Poulsenia armata				8	23		
Trichilia tuberculata				16	9		
Capparidastrum frondosum				14	53		
Virola sebifera				13	10		
Guarea bullata				46	16		
Hasseltia floribunda				10	8		
Guatteria lucens				6	5		
Cordia lasiocalyx				65	22		
Pouteria reticulata				54	25		
Ocotea whitei				3	4		
Psychotria marginata				39	17		
Chamguava schippii				12	15		
				22	40		
				4	3		
				7	7		
				93	33		
				15	19		
				31	18		
				17	30		
				83	35		
				34	70		
				20	13		
				121	45		
				38	29		
				41	31		
				37	77		
				11	11		
				19	12		
				29	50		
				26	21		
				28	42		
				78	43		
				30	48		
				27	24		
				44	81		
				74	49		
				127	65		

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

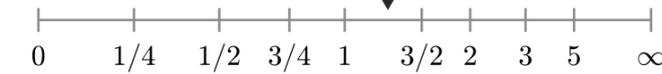
46.3%—53.7%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

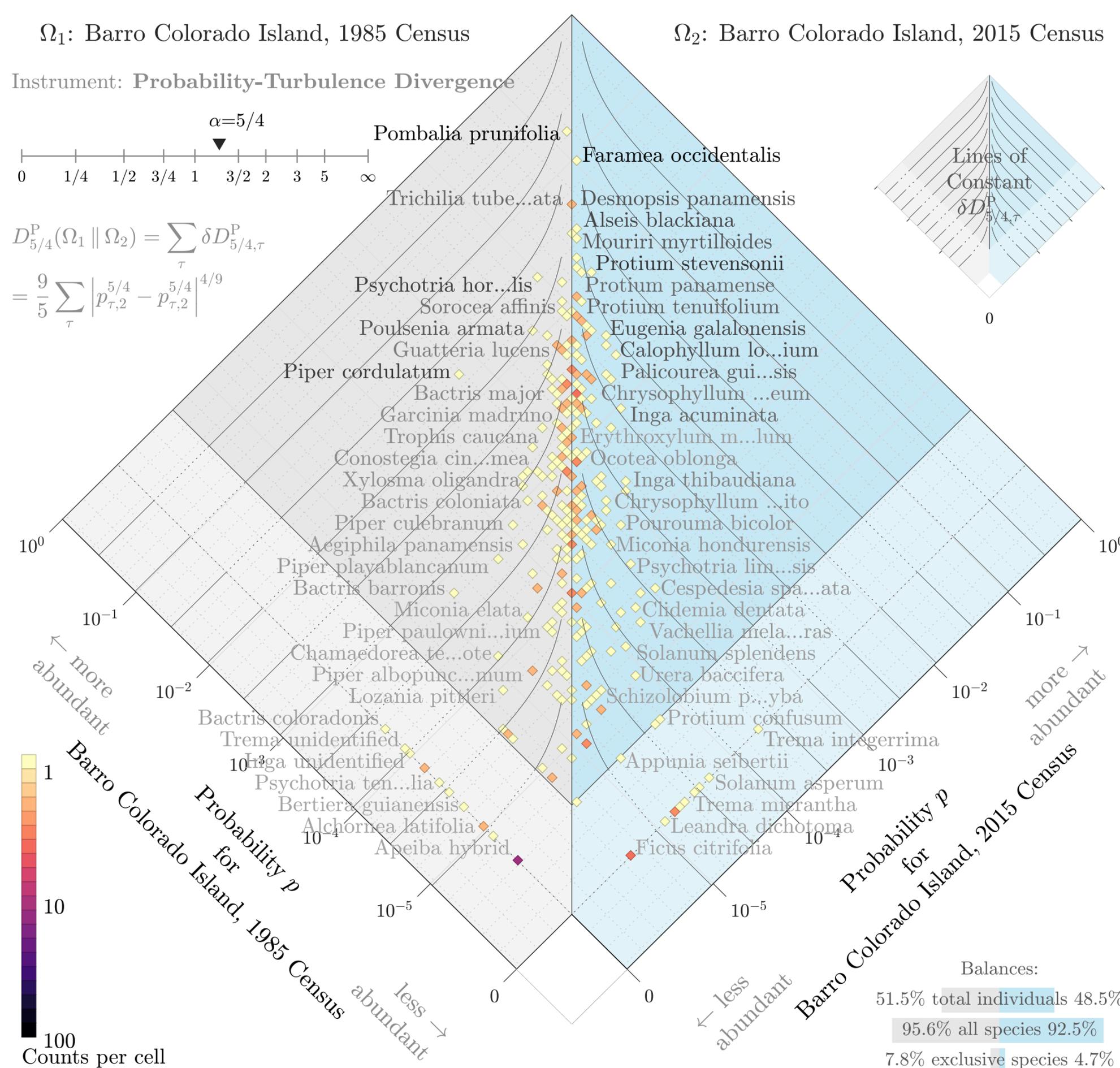
Instrument: **Probability-Turbulence Divergence**

$\alpha=5/4$



$$D_{5/4}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{5/4,\tau}^P$$

$$= \frac{9}{5} \sum_{\tau} \left| p_{\tau,2}^{5/4} - p_{\tau,2} \right|^{4/9}$$



Divergence contribution  $\delta D_{5/4,\tau}^P$  (%)



Pombalia prunifolia	1 $\rightleftharpoons$ 1
	2 $\rightleftharpoons$ 2
Piper cordulatum	9 $\rightleftharpoons$ 138
Psychotria horizontalis	8 $\rightleftharpoons$ 23
	16 $\rightleftharpoons$ 9
Poulsenia armata	14 $\rightleftharpoons$ 53
	13 $\rightleftharpoons$ 10
	6 $\rightleftharpoons$ 5
	10 $\rightleftharpoons$ 8
	46 $\rightleftharpoons$ 16
Trichilia tuberculata	3 $\rightleftharpoons$ 4
	65 $\rightleftharpoons$ 22
	4 $\rightleftharpoons$ 3
	54 $\rightleftharpoons$ 25
Capparidastrum frondosum	12 $\rightleftharpoons$ 15
	39 $\rightleftharpoons$ 17
Virola sebifera	22 $\rightleftharpoons$ 40
	7 $\rightleftharpoons$ 7
Sorocea affinis	15 $\rightleftharpoons$ 19
	93 $\rightleftharpoons$ 33
	31 $\rightleftharpoons$ 18
Tachigali panamensis	17 $\rightleftharpoons$ 30
	20 $\rightleftharpoons$ 13
	83 $\rightleftharpoons$ 35
Guarea bullata	34 $\rightleftharpoons$ 70
	11 $\rightleftharpoons$ 11
	121 $\rightleftharpoons$ 45
	38 $\rightleftharpoons$ 29
	19 $\rightleftharpoons$ 12
	41 $\rightleftharpoons$ 31
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Guatteria lucens	29 $\rightleftharpoons$ 50
	26 $\rightleftharpoons$ 21
Cordia lasiocalyx	28 $\rightleftharpoons$ 42
Pouteria reticulata	30 $\rightleftharpoons$ 48
	27 $\rightleftharpoons$ 24
	78 $\rightleftharpoons$ 43
Ocotea whitei	44 $\rightleftharpoons$ 81
Pterocarpus hayesii	32 $\rightleftharpoons$ 46
	74 $\rightleftharpoons$ 49

Balances:

51.5% total individuals 48.5%

95.6% all species 92.5%

7.8% exclusive species 4.7%

46.2%—53.8%

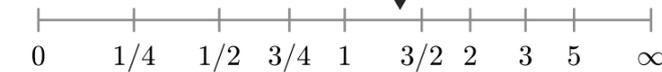
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{4/3,\tau}^P$  (%)

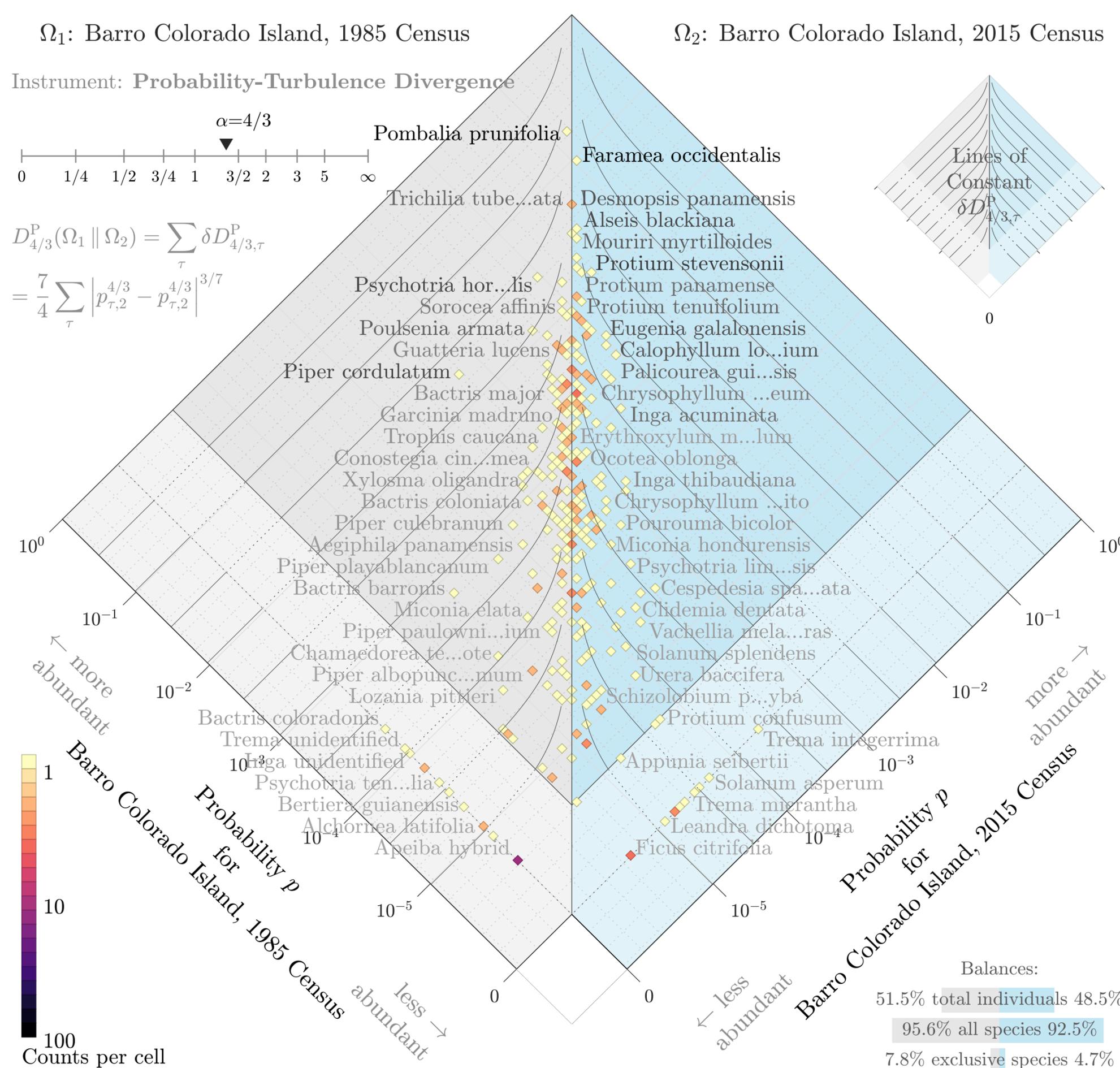
Instrument: Probability-Turbulence Divergence

$\alpha=4/3$



$$D_{4/3}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{4/3,\tau}^P$$

$$= \frac{7}{4} \sum_{\tau} \left| p_{\tau,2}^{4/3} - p_{\tau,2} \right|^{3/7}$$



Divergence contribution $\delta D_{4/3,\tau}^P$ (%)	
3	2
Pombalia prunifolia	1 $\rightleftharpoons$ 1
	2 $\rightleftharpoons$ 2 <b>Faramea occidentalis</b>
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Piper cordulatum	9 $\rightleftharpoons$ 138
	16 $\rightleftharpoons$ 9 <b>Protium stevensonii</b>
Poulsenia armata	14 $\rightleftharpoons$ 53
	13 $\rightleftharpoons$ 10 <b>Garcinia recondita</b>
	6 $\rightleftharpoons$ 5 <b>Alseis blackiana</b>
	10 $\rightleftharpoons$ 8 <b>Swartzia simplex</b>
Trichilia tuberculata	3 $\rightleftharpoons$ 4
	46 $\rightleftharpoons$ 16 <b>Eugenia galalonensis</b>
	4 $\rightleftharpoons$ 3 <b>Desmopsis panamensis</b>
	65 $\rightleftharpoons$ 22 <b>Calophyllum longifolium</b>
	54 $\rightleftharpoons$ 25 <b>Xylopia macrantha</b>
Capparidastrum frondosum	12 $\rightleftharpoons$ 15
	7 $\rightleftharpoons$ 7 <b>Mouriri myrtilloides</b>
	39 $\rightleftharpoons$ 17 <b>Cupania seemannii</b>
Virola sebifera	22 $\rightleftharpoons$ 40
Sorocea affinis	15 $\rightleftharpoons$ 19
Tachigali panamensis	17 $\rightleftharpoons$ 30
	31 $\rightleftharpoons$ 18 <b>Coussarea curvigemma</b>
	93 $\rightleftharpoons$ 33 <b>Palicourea guianensis</b>
	20 $\rightleftharpoons$ 13 <b>Protium tenuifolium</b>
	11 $\rightleftharpoons$ 11 <b>Hirtella triandra</b>
	83 $\rightleftharpoons$ 35 <b>Cecropia insignis</b>
Guarea bullata	34 $\rightleftharpoons$ 70
	19 $\rightleftharpoons$ 12 <b>Protium panamense</b>
	38 $\rightleftharpoons$ 29 <b>Tabernaemontana arborea</b>
	41 $\rightleftharpoons$ 31 <b>Simarouba amara</b>
	121 $\rightleftharpoons$ 45 <b>Inga acuminata</b>
	26 $\rightleftharpoons$ 21 <b>Acalypha diversifolia</b>
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Guatteria lucens	29 $\rightleftharpoons$ 50
Cordia lasiocalyx	28 $\rightleftharpoons$ 42
	27 $\rightleftharpoons$ 24 <b>Guarea guidonia</b>
Pouteria reticulata	30 $\rightleftharpoons$ 48
	78 $\rightleftharpoons$ 43 <b>Anaxagorea panamensis</b>
Ocotea whitei	44 $\rightleftharpoons$ 81
Pterocarpus hayesii	32 $\rightleftharpoons$ 46
	18 $\rightleftharpoons$ 14 <b>Rinorea sylvatica</b>
	46.0%—54.0%

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

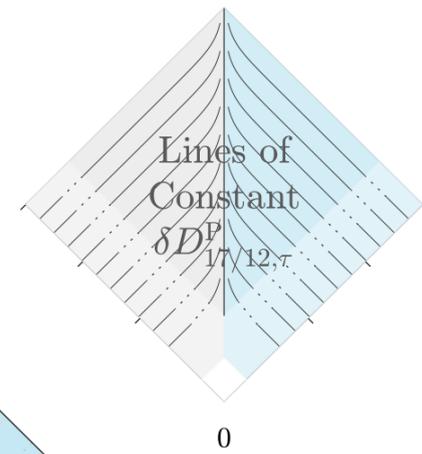
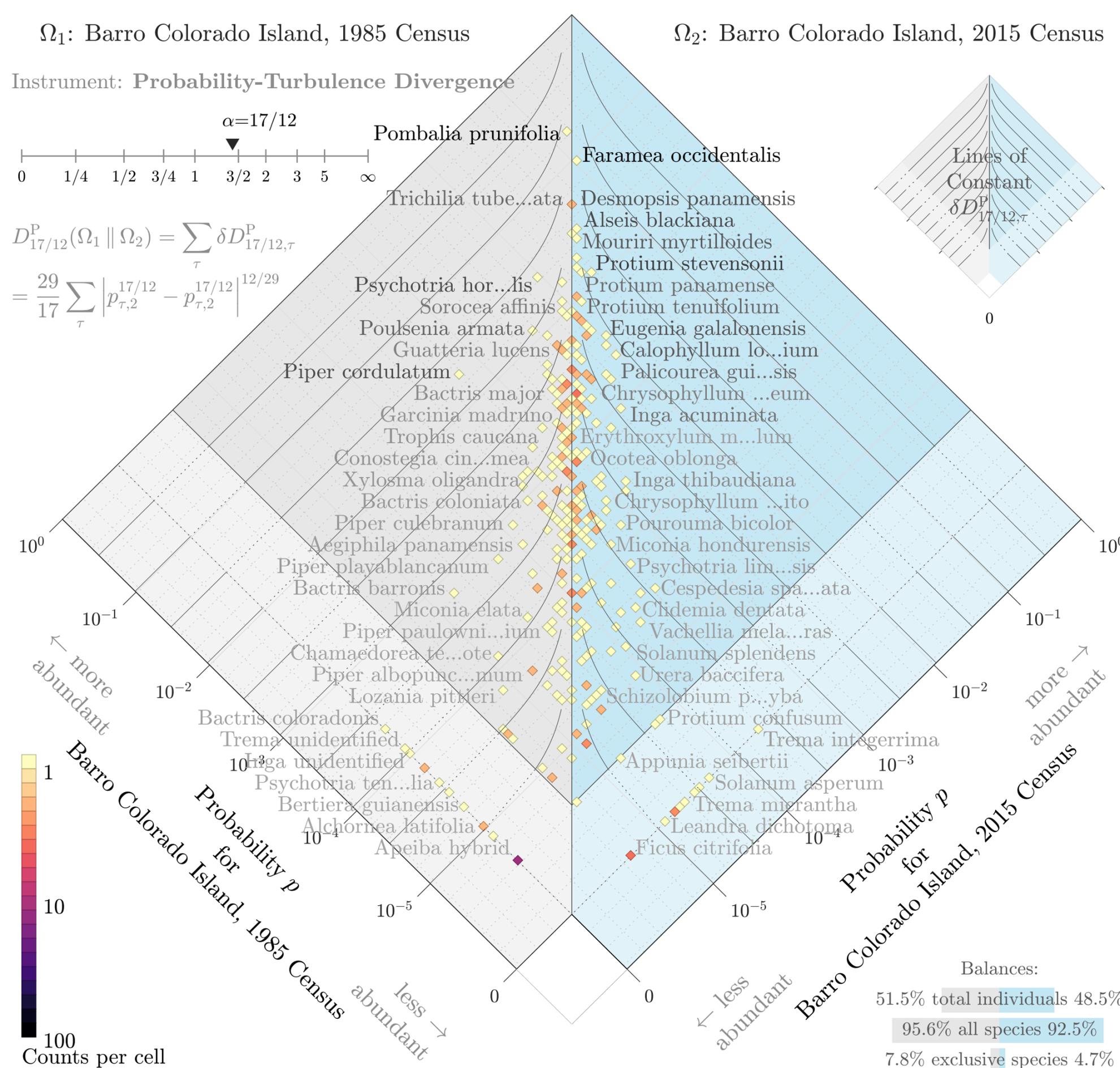
Instrument: **Probability-Turbulence Divergence**

$\alpha=17/12$



$$D_{17/12}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{17/12,\tau}^P$$

$$= \frac{29}{17} \sum_{\tau} \left| p_{\tau,2}^{17/12} - p_{\tau,2} \right|^{12/29}$$



Divergence contribution  $\delta D_{17/12,\tau}^P$  (%)



Pombalia prunifolia	1 $\rightleftharpoons$ 1
	2 $\rightleftharpoons$ 2 <b>Faramea occidentalis</b>
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Piper cordulatum	9 $\rightleftharpoons$ 138
	16 $\rightleftharpoons$ 9 <b>Protium stevensonii</b>
Poulsenia armata	14 $\rightleftharpoons$ 53
	13 $\rightleftharpoons$ 10 <b>Garcinia recondita</b>
	6 $\rightleftharpoons$ 5 <b>Alseis blackiana</b>
Trichilia tuberculata	3 $\rightleftharpoons$ 4
	10 $\rightleftharpoons$ 8 <b>Swartzia simplex</b>
	4 $\rightleftharpoons$ 3 <b>Desmopsis panamensis</b>
	46 $\rightleftharpoons$ 16 <b>Eugenia galalonensis</b>
	65 $\rightleftharpoons$ 22 <b>Calophyllum longifolium</b>
	7 $\rightleftharpoons$ 7 <b>Mouriri myrtilloides</b>
Capparidastrum frondosum	12 $\rightleftharpoons$ 15
	54 $\rightleftharpoons$ 25 <b>Xylopia macrantha</b>
	39 $\rightleftharpoons$ 17 <b>Cupania seemannii</b>
Virola sebifera	22 $\rightleftharpoons$ 40
Sorocea affinis	15 $\rightleftharpoons$ 19
Tachigali panamensis	17 $\rightleftharpoons$ 30
	31 $\rightleftharpoons$ 18 <b>Coussarea curvigemma</b>
	20 $\rightleftharpoons$ 13 <b>Protium tenuifolium</b>
	93 $\rightleftharpoons$ 33 <b>Palicourea guianensis</b>
	11 $\rightleftharpoons$ 11 <b>Hirtella triandra</b>
	19 $\rightleftharpoons$ 12 <b>Protium panamense</b>
	83 $\rightleftharpoons$ 35 <b>Cecropia insignis</b>
Guarea bullata	34 $\rightleftharpoons$ 70
	38 $\rightleftharpoons$ 29 <b>Tabernaemontana arborea</b>
	41 $\rightleftharpoons$ 31 <b>Simarouba amara</b>
	26 $\rightleftharpoons$ 21 <b>Acalypha diversifolia</b>
	121 $\rightleftharpoons$ 45 <b>Inga acuminata</b>
Guatteria lucens	29 $\rightleftharpoons$ 50
Hasseltia floribunda	37 $\rightleftharpoons$ 77
	27 $\rightleftharpoons$ 24 <b>Guarea guidonia</b>
Cordia lasiocalyx	28 $\rightleftharpoons$ 42
Pouteria reticulata	30 $\rightleftharpoons$ 48
	78 $\rightleftharpoons$ 43 <b>Anaxagorea panamensis</b>
Ocotea whitei	44 $\rightleftharpoons$ 81
	18 $\rightleftharpoons$ 14 <b>Rinorea sylvatica</b>
Pterocarpus hayesii	32 $\rightleftharpoons$ 46

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

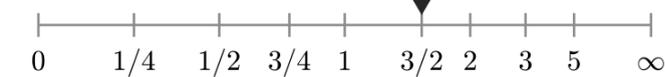
45.9%—54.1%

$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

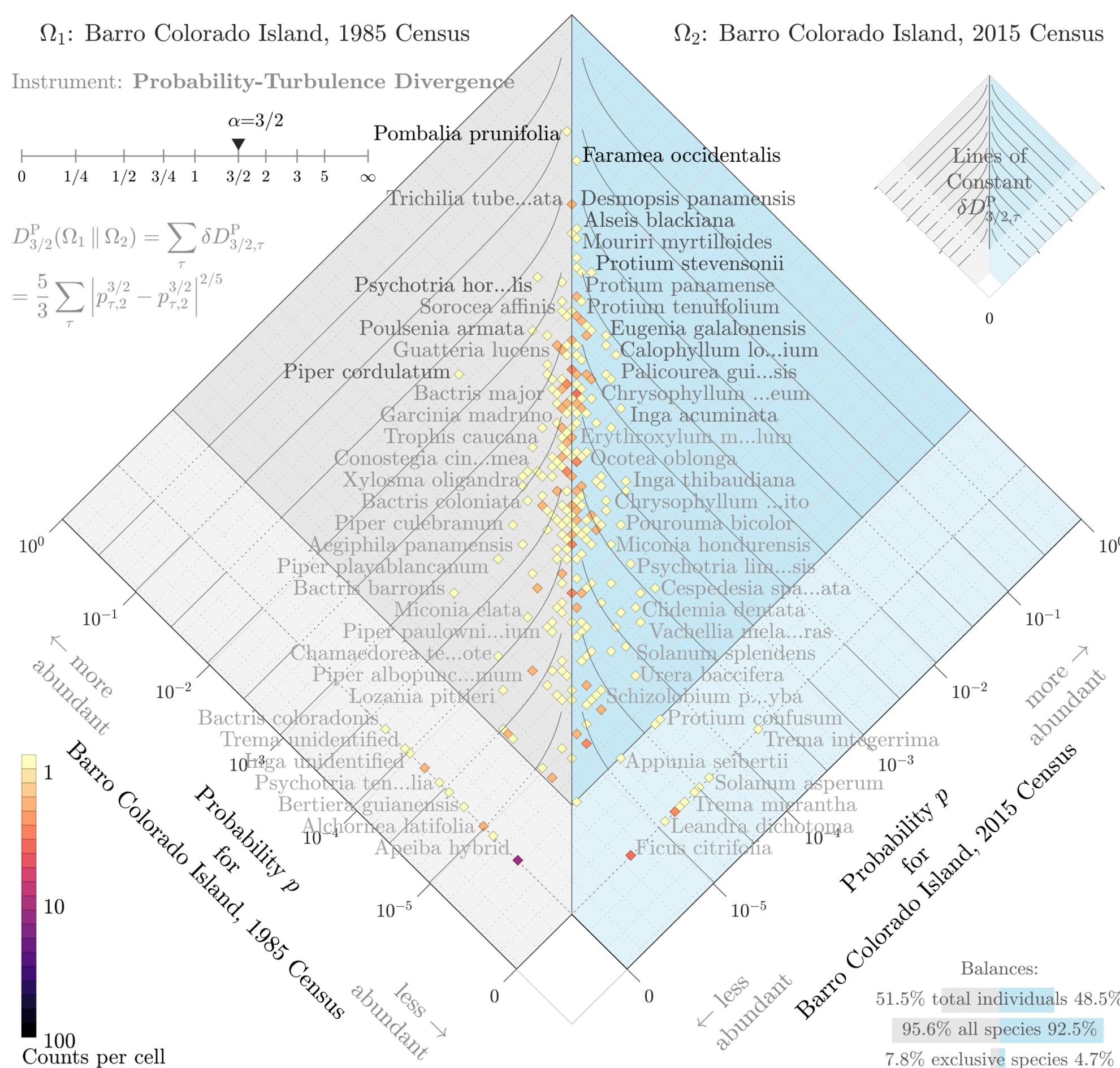
Instrument: **Probability-Turbulence Divergence**

$\alpha=3/2$

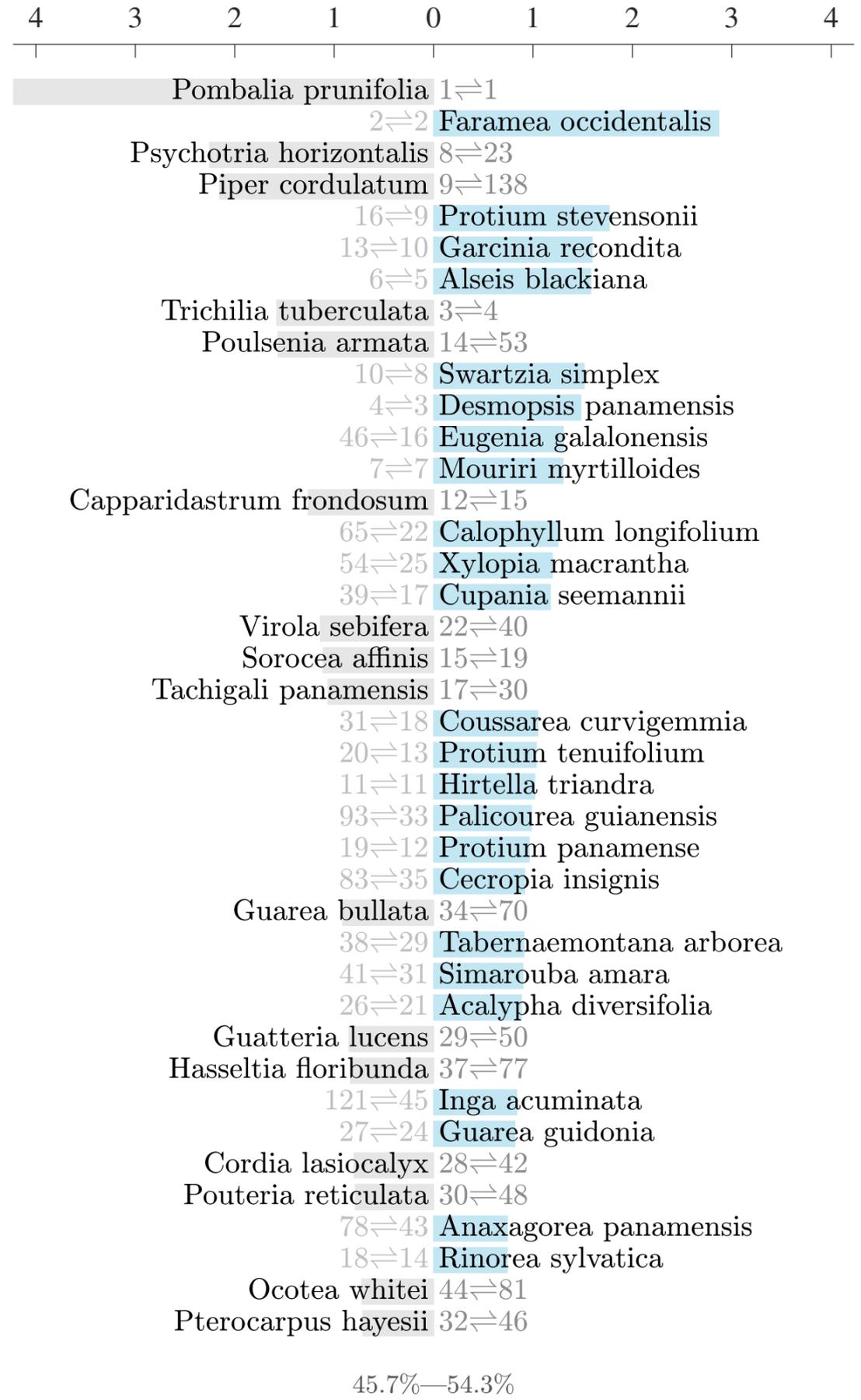


$$D_{3/2}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{3/2,\tau}^P$$

$$= \frac{5}{3} \sum_{\tau} \left| p_{\tau,2}^{3/2} - p_{\tau,1}^{3/2} \right|^{2/5}$$



Divergence contribution  $\delta D_{3/2,\tau}^P$  (%)



Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

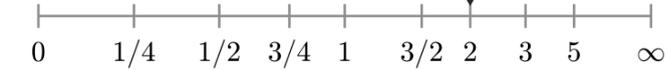
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{2,\tau}^P$  (%)

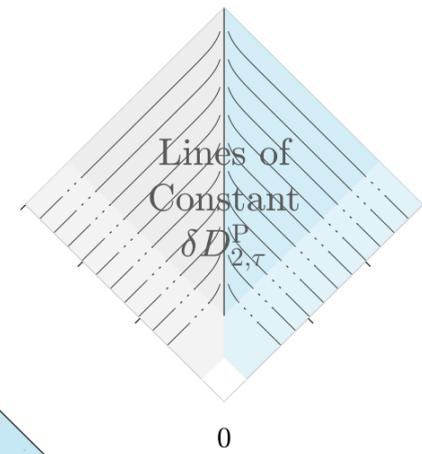
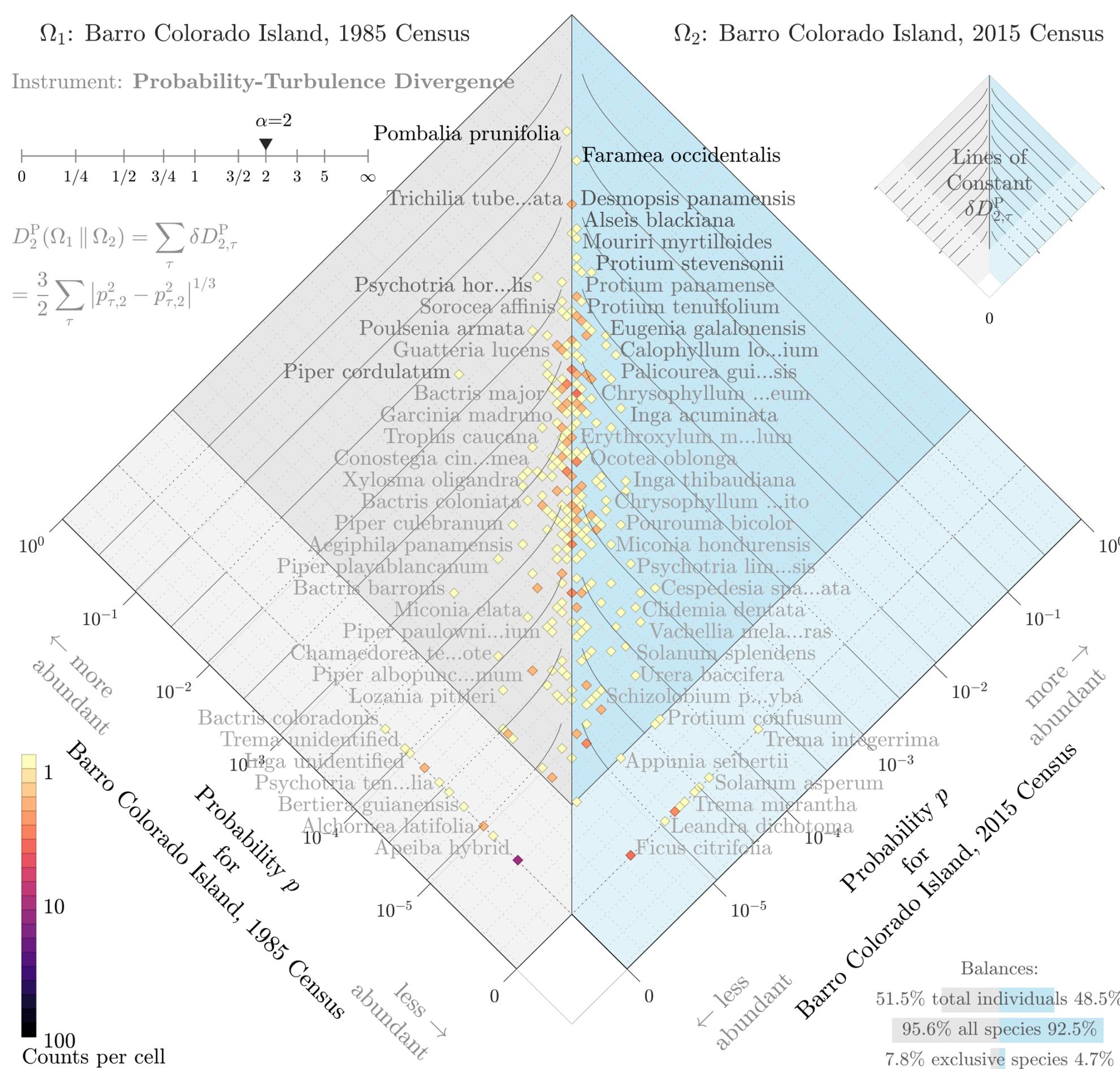
Instrument: Probability-Turbulence Divergence

$\alpha=2$



$$D_2^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{2,\tau}^P$$

$$= \frac{3}{2} \sum_{\tau} |p_{\tau,2}^2 - p_{\tau,1}^2|^{1/3}$$



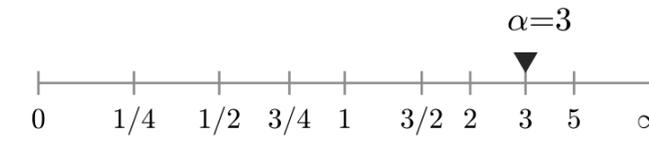
Divergence contribution $\delta D_{2,\tau}^P$ (%)	
5	0
Pombalia prunifolia	1 $\rightleftharpoons$ 1
	2 $\rightleftharpoons$ 2 <b>Faramea occidentalis</b>
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Piper cordulatum	9 $\rightleftharpoons$ 138
Trichilia tuberculata	3 $\rightleftharpoons$ 4
	4 $\rightleftharpoons$ 3 <b>Desmopsis panamensis</b>
	6 $\rightleftharpoons$ 5 <b>Alseis blackiana</b>
	16 $\rightleftharpoons$ 9 <b>Protium stevensonii</b>
	13 $\rightleftharpoons$ 10 <b>Garcinia recondita</b>
	10 $\rightleftharpoons$ 8 <b>Swartzia simplex</b>
	7 $\rightleftharpoons$ 7 <b>Mouriri myrtilloides</b>
Poulsenia armata	14 $\rightleftharpoons$ 53
Capparidastrum frondosum	12 $\rightleftharpoons$ 15
	46 $\rightleftharpoons$ 16 <b>Eugenia galalonensis</b>
	11 $\rightleftharpoons$ 11 <b>Hirtella triandra</b>
Sorocea affinis	15 $\rightleftharpoons$ 19
	65 $\rightleftharpoons$ 22 <b>Calophyllum longifolium</b>
	39 $\rightleftharpoons$ 17 <b>Cupania seemannii</b>
	54 $\rightleftharpoons$ 25 <b>Xylopia macrantha</b>
	20 $\rightleftharpoons$ 13 <b>Protium tenuifolium</b>
Virola sebifera	22 $\rightleftharpoons$ 40
Tachigali panamensis	17 $\rightleftharpoons$ 30
	31 $\rightleftharpoons$ 18 <b>Coussarea curvigemma</b>
	19 $\rightleftharpoons$ 12 <b>Protium panamense</b>
	26 $\rightleftharpoons$ 21 <b>Acalypha diversifolia</b>
	38 $\rightleftharpoons$ 29 <b>Tabernaemontana arborea</b>
	93 $\rightleftharpoons$ 33 <b>Palicourea guianensis</b>
	41 $\rightleftharpoons$ 31 <b>Simarouba amara</b>
	27 $\rightleftharpoons$ 24 <b>Guarea guidonia</b>
Guarea bullata	34 $\rightleftharpoons$ 70
	18 $\rightleftharpoons$ 14 <b>Rinorea sylvatica</b>
	83 $\rightleftharpoons$ 35 <b>Cecropia insignis</b>
Guatteria lucens	29 $\rightleftharpoons$ 50
	5 $\rightleftharpoons$ 6 <b>Oenocarpus mapora</b>
Cordia lasiocalyx	28 $\rightleftharpoons$ 42
Pouteria reticulata	30 $\rightleftharpoons$ 48
Hasseltia floribunda	37 $\rightleftharpoons$ 77
Beilschmiedia towarensis	21 $\rightleftharpoons$ 28
	121 $\rightleftharpoons$ 45 <b>Inga acuminata</b>
Pterocarpus hayesii	32 $\rightleftharpoons$ 46

45.2%—54.8%

$\Omega_1$ : Barro Colorado Island, 1985 Census

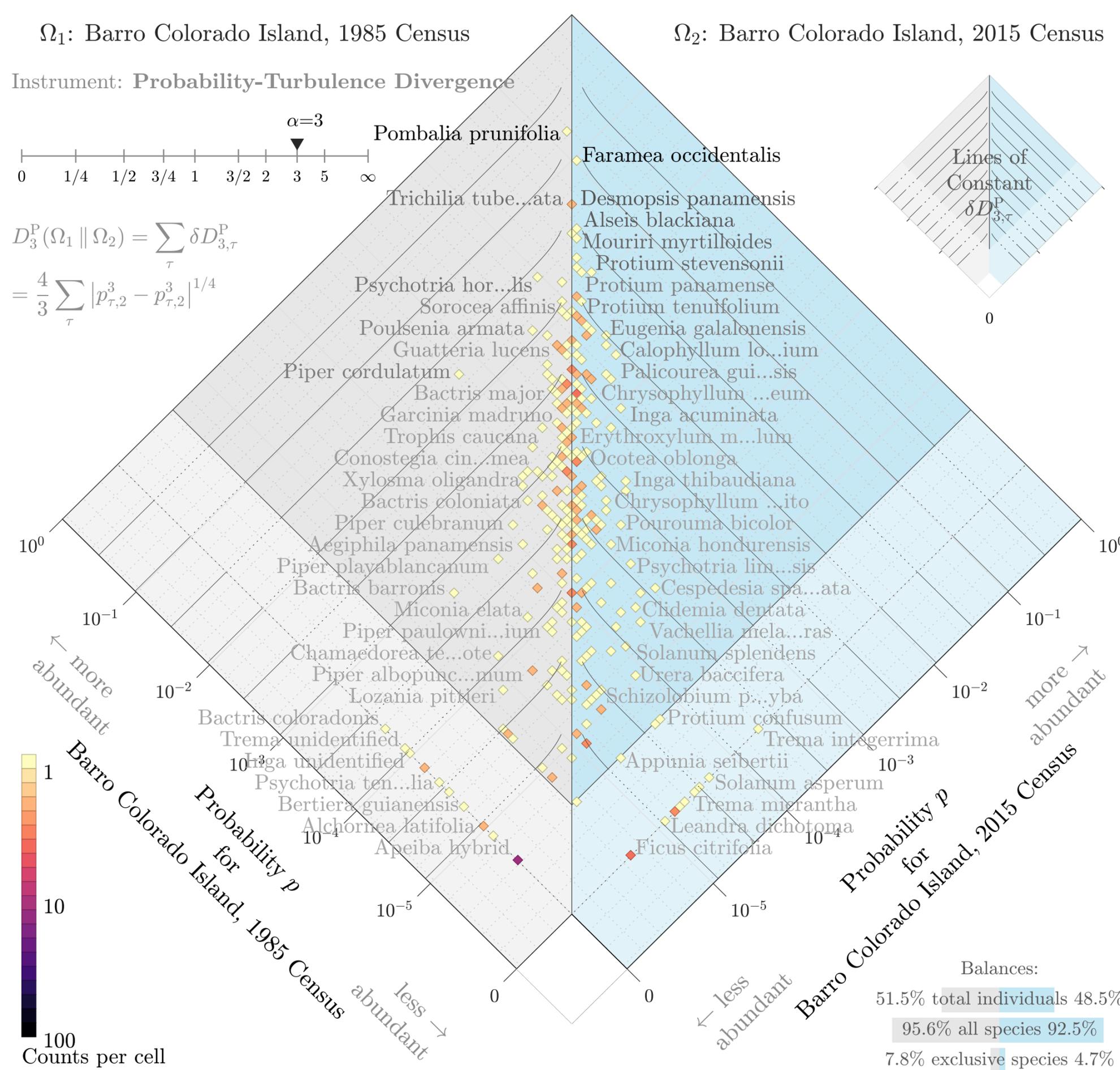
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_3^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{3,\tau}^P$$

$$= \frac{4}{3} \sum_{\tau} |p_{\tau,2}^3 - p_{\tau,1}^3|^{1/4}$$



Divergence contribution  $\delta D_{3,\tau}^P$  (%)

6		4		2		0		2		4		6	
Pombalia prunifolia	1	⇒	1										
	2	⇒	2	Faramea occidentalis									
Trichilia tuberculata	3	⇒	4										
	4	⇒	3	Desmopsis panamensis									
Psychotria horizontalis	8	⇒	23										
	6	⇒	5	Alseis blackiana									
Piper cordulatum	9	⇒	138										
	16	⇒	9	Protium stevensonii									
	7	⇒	7	Mouriri myrtilloides									
	10	⇒	8	Swartzia simplex									
	13	⇒	10	Garcinia recondita									
Capparidastrum frondosum	12	⇒	15										
Poulsenia armata	14	⇒	53										
	11	⇒	11	Hirtella triandra									
Sorocea affinis	15	⇒	19										
	5	⇒	6	Oenocarpus mapora									
	20	⇒	13	Protium tenuifolium									
	46	⇒	16	Eugenia galalonensis									
	19	⇒	12	Protium panamense									
Tachigali panamensis	17	⇒	30										
	39	⇒	17	Cupania seemannii									
	65	⇒	22	Calophyllum longifolium									
Virola sebifera	22	⇒	40										
	31	⇒	18	Coussarea curvigemma									
	54	⇒	25	Xylopia macrantha									
	18	⇒	14	Rinorea sylvatica									
	26	⇒	21	Acalypha diversifolia									
	27	⇒	24	Guarea guidonia									
	38	⇒	29	Tabernaemontana arborea									
	41	⇒	31	Simarouba amara									
Beilschmiedia tovarensis	21	⇒	28										
Guatteria lucens	29	⇒	50										
	93	⇒	33	Palicourea guianensis									
Cordia lasiocalyx	28	⇒	42										
Guarea bullata	34	⇒	70										
Pouteria reticulata	30	⇒	48										
	83	⇒	35	Cecropia insignis									
Pterocarpus hayesii	32	⇒	46										
Hasseltia floribunda	37	⇒	77										
	25	⇒	27	Eugenia oerstediana									
	44.6%—55.4%												

$\Omega_1$ : Barro Colorado Island, 1985 Census

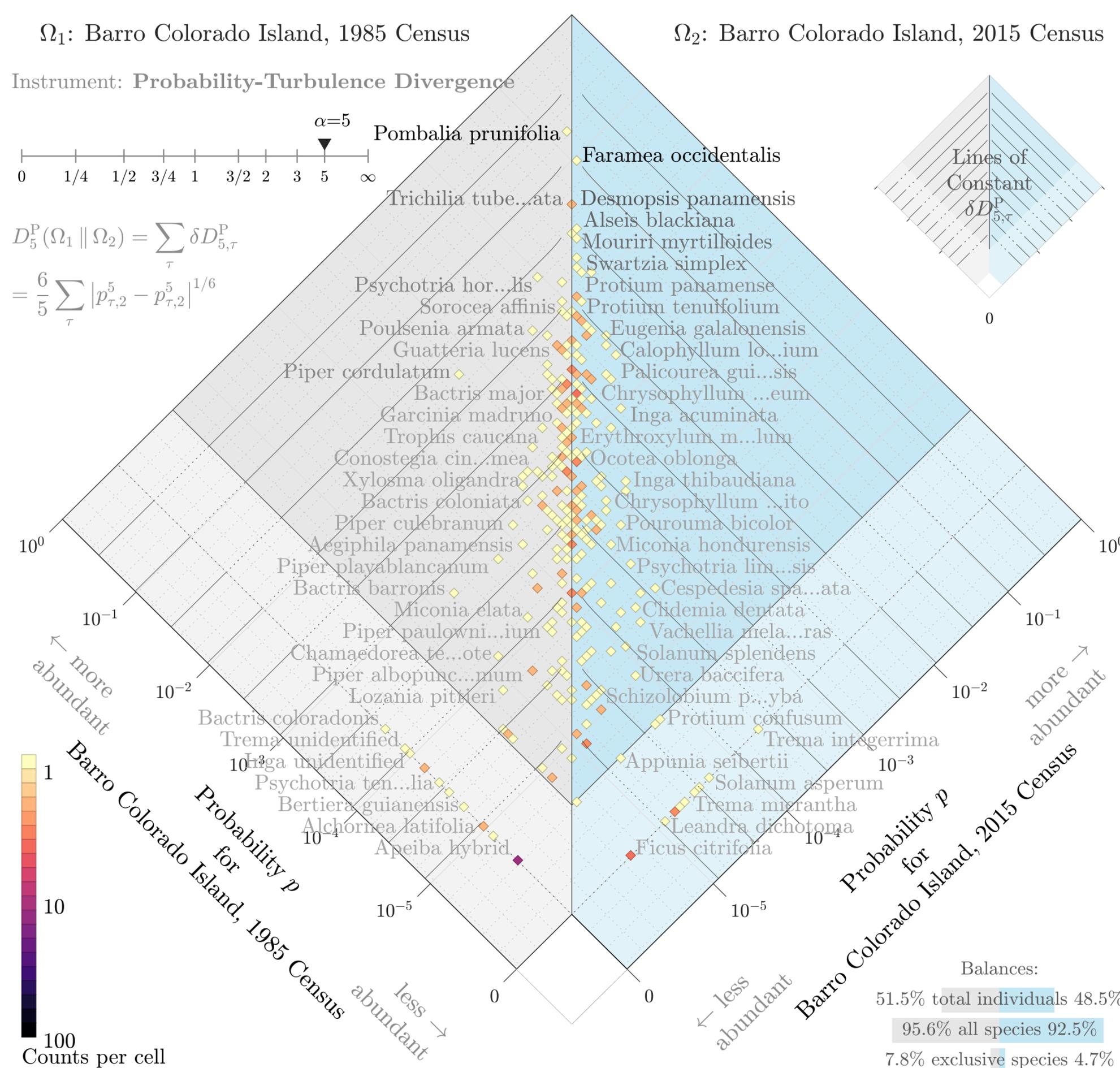
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_5^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{5,\tau}^P$$

$$= \frac{6}{5} \sum_{\tau} |p_{\tau,2}^5 - p_{\tau,1}^5|^{1/6}$$



Divergence contribution  $\delta D_{5,\tau}^P$  (%)



Pombalia prunifolia	1 ⇌ 1
	2 ⇌ 2 <b>Faramea occidentalis</b>
Trichilia tuberculata	3 ⇌ 4
	4 ⇌ 3 <b>Desmopsis panamensis</b>
	6 ⇌ 5 <b>Alseis blackiana</b>
	7 ⇌ 7 <b>Mouriri myrtilloides</b>
Psychotria horizontalis	8 ⇌ 23
	10 ⇌ 8 <b>Swartzia simplex</b>
	16 ⇌ 9 <b>Protium stevensonii</b>
Piper cordulatum	9 ⇌ 138
	13 ⇌ 10 <b>Garcinia recondita</b>
	5 ⇌ 6 <b>Oenocarpus mapora</b>
	11 ⇌ 11 <b>Hirtella triandra</b>
Capparidastrium frondosum	12 ⇌ 15
Poulsenia armata	14 ⇌ 53
Sorocea affinis	15 ⇌ 19
	20 ⇌ 13 <b>Protium tenuifolium</b>
	19 ⇌ 12 <b>Protium panamense</b>
Tachigali panamensis	17 ⇌ 30
	46 ⇌ 16 <b>Eugenia galalonensis</b>
	18 ⇌ 14 <b>Rinorea sylvatica</b>
	39 ⇌ 17 <b>Cupania seemannii</b>
	31 ⇌ 18 <b>Coussarea curvigemma</b>
Virola sebifera	22 ⇌ 40
	65 ⇌ 22 <b>Calophyllum longifolium</b>
	26 ⇌ 21 <b>Acalypha diversifolia</b>
	54 ⇌ 25 <b>Xylopia macrantha</b>
	27 ⇌ 24 <b>Guarea guidonia</b>
Beilschmiedia towarensis	21 ⇌ 28
	38 ⇌ 29 <b>Tabernaemontana arborea</b>
	41 ⇌ 31 <b>Simarouba amara</b>
	25 ⇌ 27 <b>Eugenia oerstediana</b>
	23 ⇌ 20 <b>Quararibea asterolepis</b>
Guatteria lucens	29 ⇌ 50
Cordia lasiocalyx	28 ⇌ 42
	24 ⇌ 26 <b>Drypetes standleyi</b>
Pouteria reticulata	30 ⇌ 48
	93 ⇌ 33 <b>Palicourea guianensis</b>
Guarea bullata	34 ⇌ 70
Pterocarpus hayesii	32 ⇌ 46

44.2%—55.8%

$\Omega_1$ : Barro Colorado Island, 1985 Census

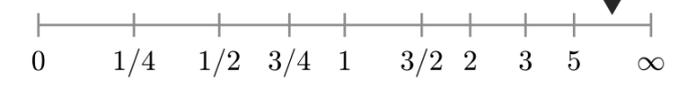
$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{10,\tau}^P$  (%)

10 5 0 5 10

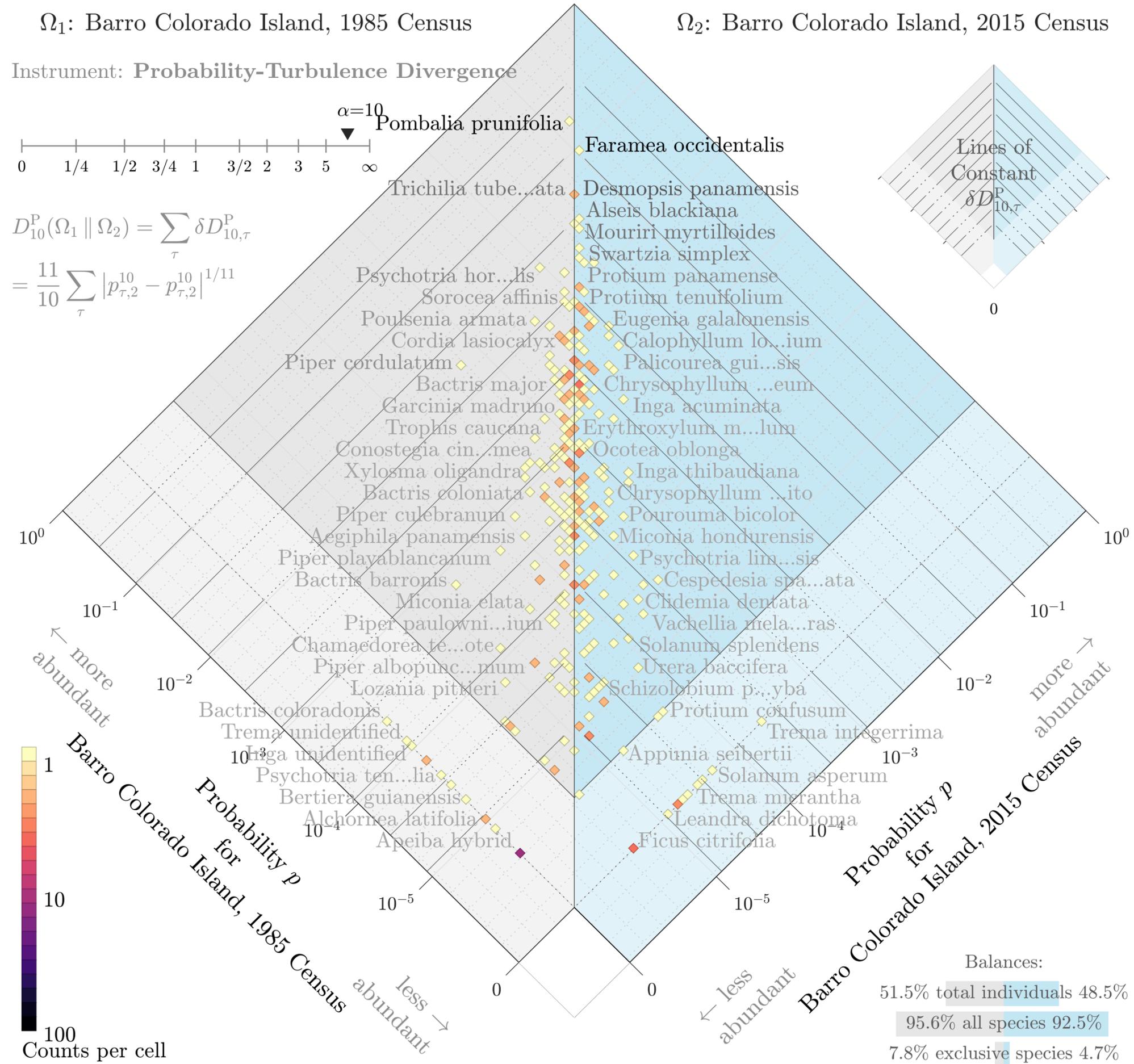
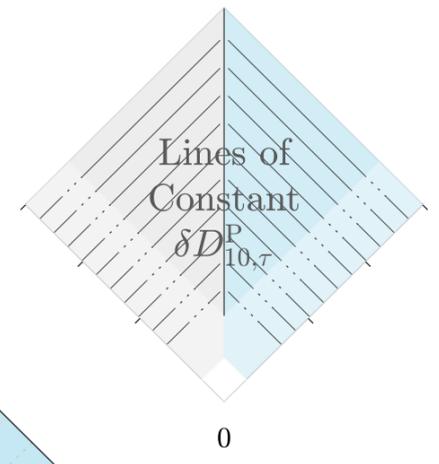
Instrument: Probability-Turbulence Divergence

$\alpha=10$



$$D_{10}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{10,\tau}^P$$

$$= \frac{11}{10} \sum_{\tau} |p_{\tau,2}^{10} - p_{\tau,2}^{10}|^{1/11}$$



Pombalia prunifolia	1 ⇌ 1
	2 ⇌ 2 <b>Faramea occidentalis</b>
	4 ⇌ 3 <b>Desmopsis panamensis</b>
Trichilia tuberculata	3 ⇌ 4
	6 ⇌ 5 <b>Alseis blackiana</b>
	7 ⇌ 7 <b>Mouriri myrtilloides</b>
	5 ⇌ 6 <b>Oenocarpus mapora</b>
Psychotria horizontalis	8 ⇌ 23
	10 ⇌ 8 <b>Swartzia simplex</b>
	16 ⇌ 9 <b>Protium stevensonii</b>
	13 ⇌ 10 <b>Garcinia recondita</b>
Piper cordulatum	9 ⇌ 138
	11 ⇌ 11 <b>Hirtella triandra</b>
Capparidastrum frondosum	12 ⇌ 15
Poulsenia armata	14 ⇌ 53
Sorocea affinis	15 ⇌ 19
	19 ⇌ 12 <b>Protium panamense</b>
	20 ⇌ 13 <b>Protium tenuifolium</b>
	18 ⇌ 14 <b>Rinorea sylvatica</b>
Tachigali panamensis	17 ⇌ 30
	46 ⇌ 16 <b>Eugenia galalonensis</b>
	39 ⇌ 17 <b>Cupania seemannii</b>
	31 ⇌ 18 <b>Coussarea curvigemma</b>
	26 ⇌ 21 <b>Acalypha diversifolia</b>
Virola sebifera	22 ⇌ 40
	65 ⇌ 22 <b>Calophyllum longifolium</b>
Beilschmiedia tovarensis	21 ⇌ 28
	54 ⇌ 25 <b>Xylopia macrantha</b>
	27 ⇌ 24 <b>Guarea guidonia</b>
	23 ⇌ 20 <b>Quararibea asterolepis</b>
	25 ⇌ 27 <b>Eugenia oerstediana</b>
	24 ⇌ 26 <b>Drypetes standleyi</b>
	38 ⇌ 29 <b>Tabernaemontana arborea</b>
	41 ⇌ 31 <b>Simarouba amara</b>
Cordia lasiocalyx	28 ⇌ 42
Guatteria lucens	29 ⇌ 50
Pouteria reticulata	30 ⇌ 48
	35 ⇌ 32 <b>Prioria copaifera</b>
Pterocarpus hayesii	32 ⇌ 46
	93 ⇌ 33 <b>Palicourea guianensis</b>

Balances:

51.5% total individuals 48.5%

95.6% all species 92.5%

7.8% exclusive species 4.7%

44.1%—55.9%

$\Omega_1$ : Barro Colorado Island, 1985 Census

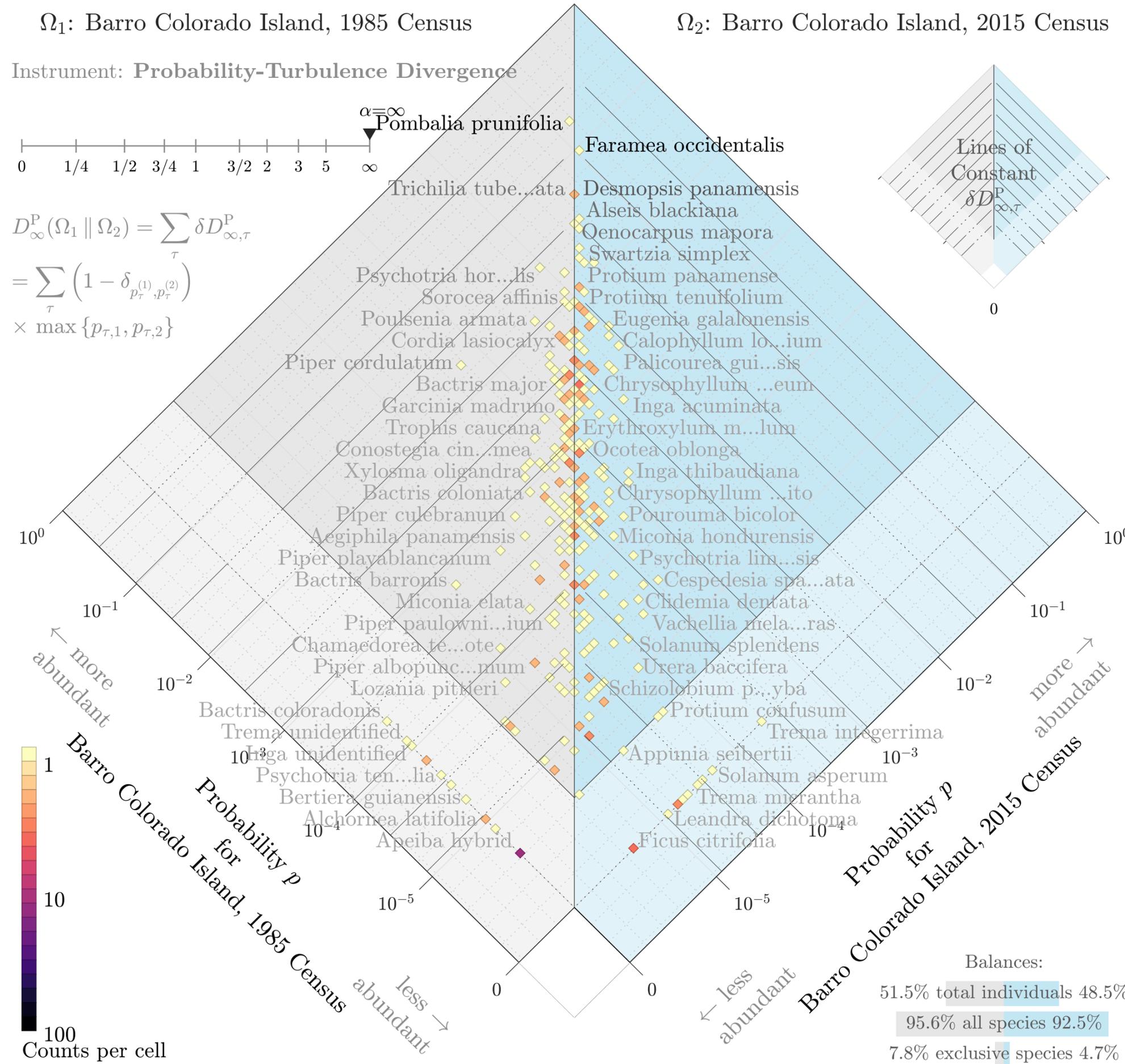
$\Omega_2$ : Barro Colorado Island, 2015 Census

Instrument: **Probability-Turbulence Divergence**



$$D_{\infty}^P(\Omega_1 \parallel \Omega_2) = \sum_{\tau} \delta D_{\infty, \tau}^P$$

$$= \sum_{\tau} \left( 1 - \delta_{p_{\tau}^{(1)}, p_{\tau}^{(2)}} \right) \times \max \{ p_{\tau, 1}, p_{\tau, 2} \}$$



Divergence contribution  $\delta D_{\infty, \tau}^P$  (%)

Species	1985 Count	2015 Count
Pombalia prunifolia	1	1
Faramea occidentalis	2	2
Desmopsis panamensis	4	3
Trichilia tuberculata	3	4
Alseis blackiana	6	5
Oenocarpus mapora	5	6
Mouriri myrtilloides	7	7
Psychotria horizontalis	8	23
Swartzia simplex	10	8
Protium stevensonii	16	9
Garcinia recondita	13	10
Piper cordulatum	9	138
Hirtella triandra	11	11
Capparidastrum frondosum	12	15
Poulsenia armata	14	53
Sorocea affinis	15	19
Protium panamense	19	12
Protium tenuifolium	20	13
Rinorea sylvatica	18	14
Tachigali panamensis	17	30
Eugenia galalonensis	46	16
Cupania seemannii	39	17
Coussarea curvigemma	31	18
Quararibea asterolepis	23	20
Acalypha diversifolia	26	21
Beilschmiedia tovarensis	21	28
Virola sebifera	22	40
Calophyllum longifolium	65	22
Guarea guidonia	27	24
Xylopia macrantha	54	25
Drypetes standleyi	24	26
Eugenia oerstediana	25	27
Tabernaemontana arborea	38	29
Simarouba amara	41	31
Cordia lasiocalyx	28	42
Guatteria lucens	29	50
Pouteria reticulata	30	48
Prioria copaifera	35	32
Pterocarpus hayesii	32	46
Palicourea guianensis	93	33

Balances:  
 51.5% total individuals 48.5%  
 95.6% all species 92.5%  
 7.8% exclusive species 4.7%

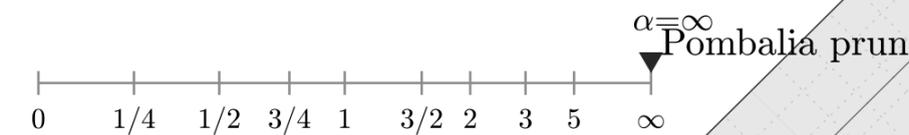
$\Omega_1$ : Barro Colorado Island, 1985 Census

$\Omega_2$ : Barro Colorado Island, 2015 Census

Divergence contribution  $\delta D_{\infty, \tau}^P$  (%)

15 10 5 0 5 10 15

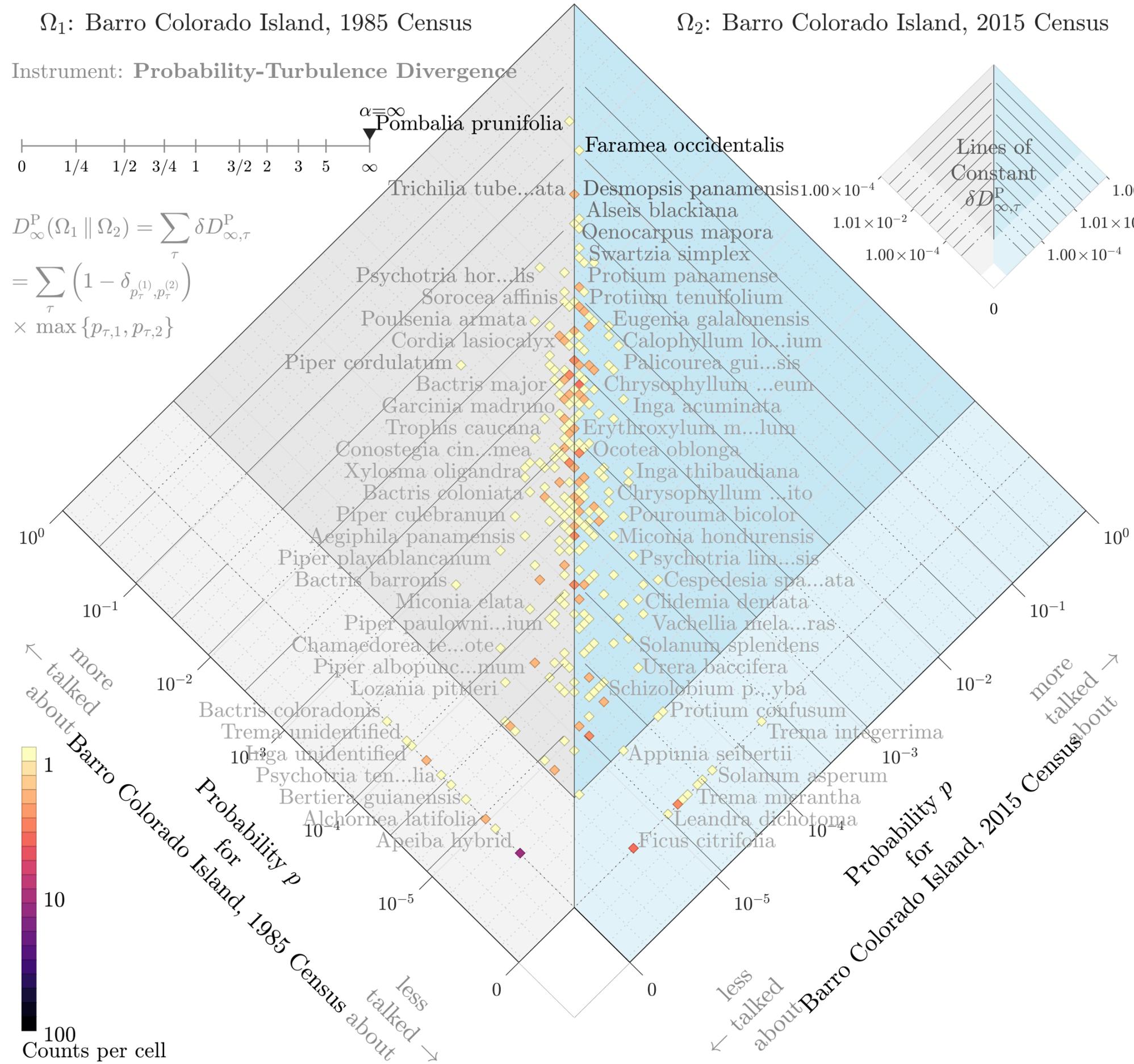
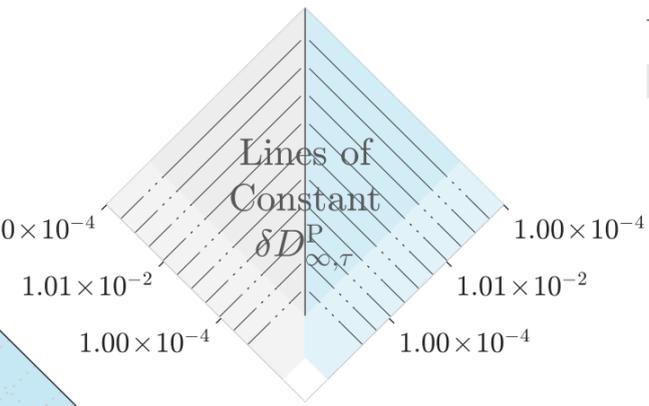
Instrument: **Probability-Turbulence Divergence**



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$$= \sum_{\tau} \left( 1 - \delta_{p_{\tau}^{(1)}, p_{\tau}^{(2)}} \right)$$

$$\times \max \{ p_{\tau, 1}, p_{\tau, 2} \}$$



Pombalia prunifolia	1 $\rightleftharpoons$ 1
Faramea occidentalis	2 $\rightleftharpoons$ 2
Desmopsis panamensis	4 $\rightleftharpoons$ 3
Trichilia tuberculata	3 $\rightleftharpoons$ 4
Alseis blackiana	6 $\rightleftharpoons$ 5
Oenocarpus mapora	5 $\rightleftharpoons$ 6
Mouriri myrtilloides	7 $\rightleftharpoons$ 7
Psychotria horizontalis	8 $\rightleftharpoons$ 23
Swartzia simplex	10 $\rightleftharpoons$ 8
Protium stevensonii	16 $\rightleftharpoons$ 9
Garcinia reconcita	13 $\rightleftharpoons$ 10
Piper cordulatum	9 $\rightleftharpoons$ 138
Hirtella triandra	11 $\rightleftharpoons$ 11
Capparidastrum frondosum	12 $\rightleftharpoons$ 15
Poulsenia armata	14 $\rightleftharpoons$ 53
Sorocea affinis	15 $\rightleftharpoons$ 19
Protium panamense	19 $\rightleftharpoons$ 12
Protium tenuifolium	20 $\rightleftharpoons$ 13
Rinorea sylvatica	18 $\rightleftharpoons$ 14
Tachigali panamensis	17 $\rightleftharpoons$ 30
Eugenia galalonensis	46 $\rightleftharpoons$ 16
Cupania seemannii	39 $\rightleftharpoons$ 17
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Prioria copaifera	35 $\rightleftharpoons$ 32
Pterocarpus hayesii	32 $\rightleftharpoons$ 46
Palicourea guianensis	93 $\rightleftharpoons$ 33

44.4%—55.6%