

クエーサーの近赤外線波長での色

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高妻 真次郎、山岡 均(九大理)

Introduction

—AGN color selection

- 様々な波長帯でのcolor selection

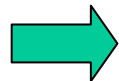
- UV-excess (Sandage 1965; Schmidt & Green 1983)

- Optical (Richards et al. 2002)

- Optical and near-infrared (Glikman et al. 2007)

- Mid-infrared (Lacy et al. 2004; Stern et al. 2005)

- 本講演



- 近赤外線波長のみでのAGNのcolor selection



Contents

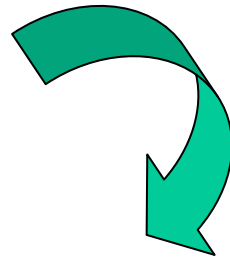
- 既知のAGN(カタログ)を用いたAGNの二色図上での分布
- AGNを抜き出すためのcolor selectionの条件
- 既知AGNの二色図上での分布割合
- モンテカルロ・シミュレーションによるクエーサーのNIR color
- 他の天体(Microquasar, CV, LMXB, MYSO)が類似した分布を示す可能性の検討

2MASS

Two Micron All Sky Survey

近赤外線3バンドで全天を撮像観測

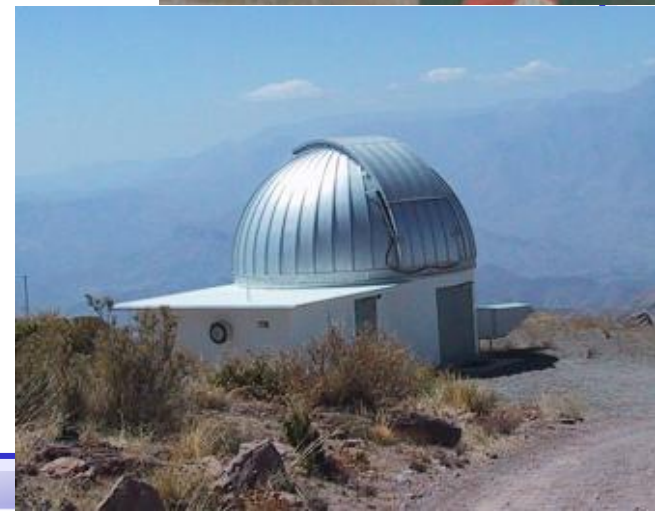
- J ($1.25 \mu\text{m}$)
- H ($1.65 \mu\text{m}$)
- Ks ($2.17 \mu\text{m}$)



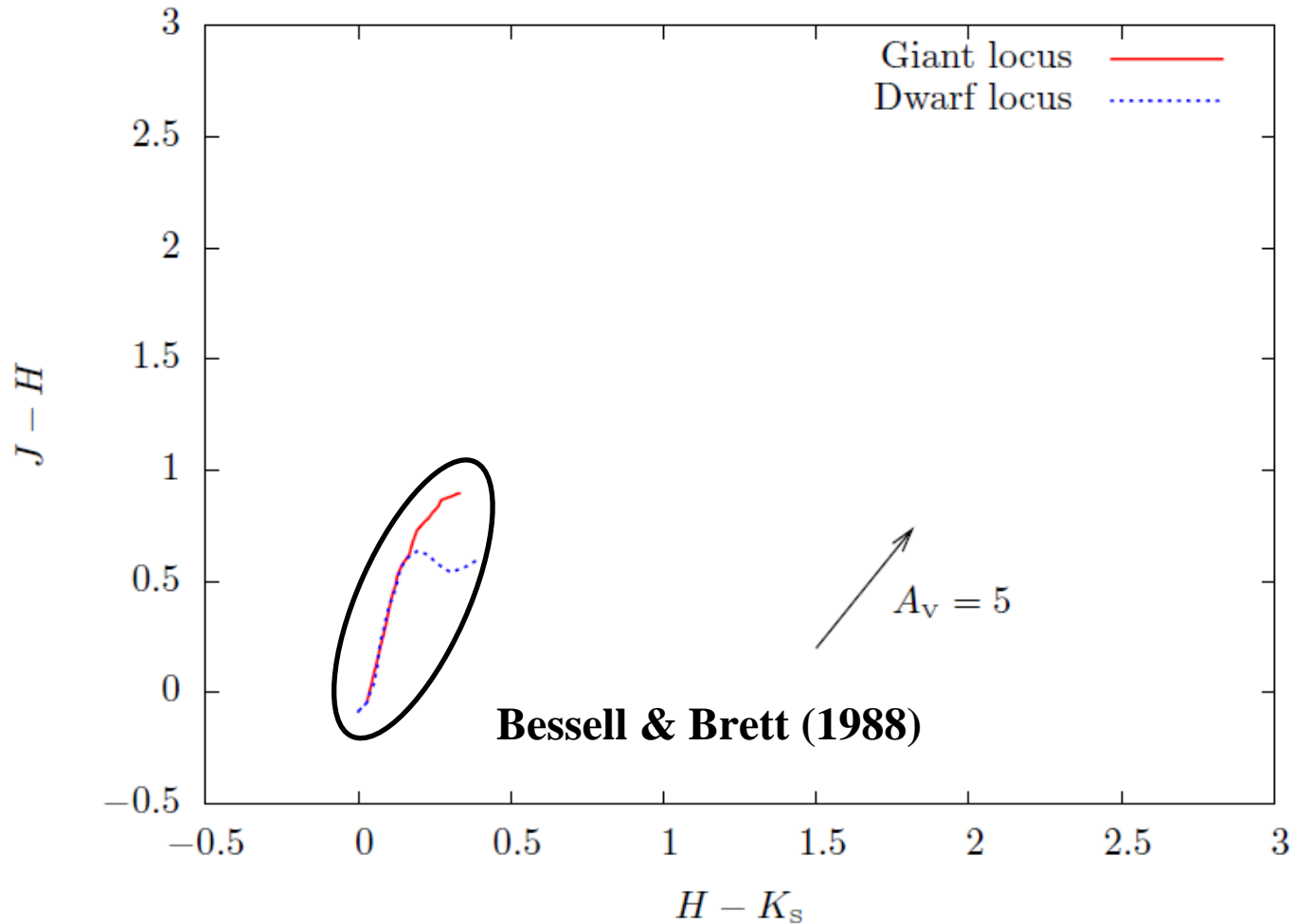
2003年に点源カタログを公開

—約4億7千万天体

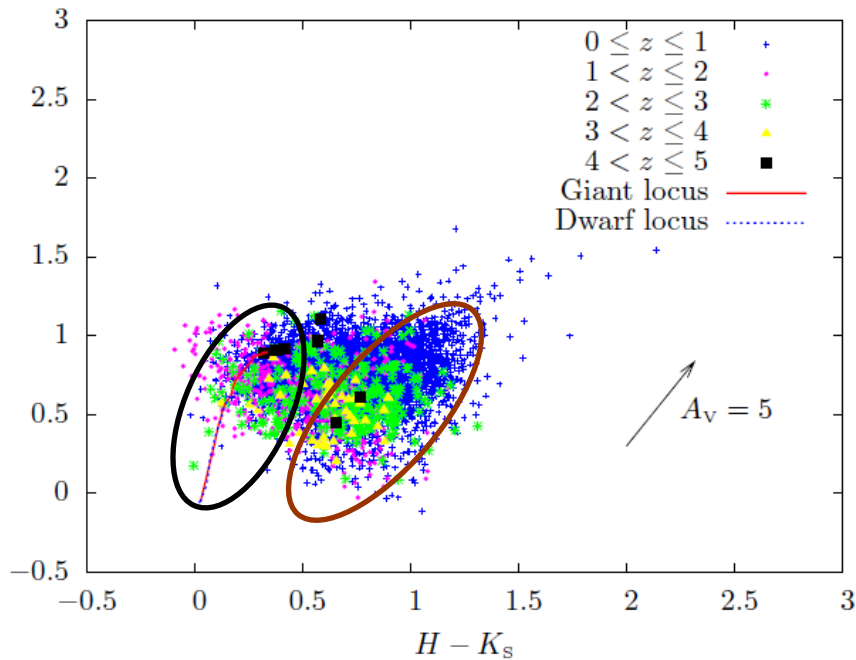
—15.8 (J), 15.1 (H), 14.3 (Ks) (S/N>10)



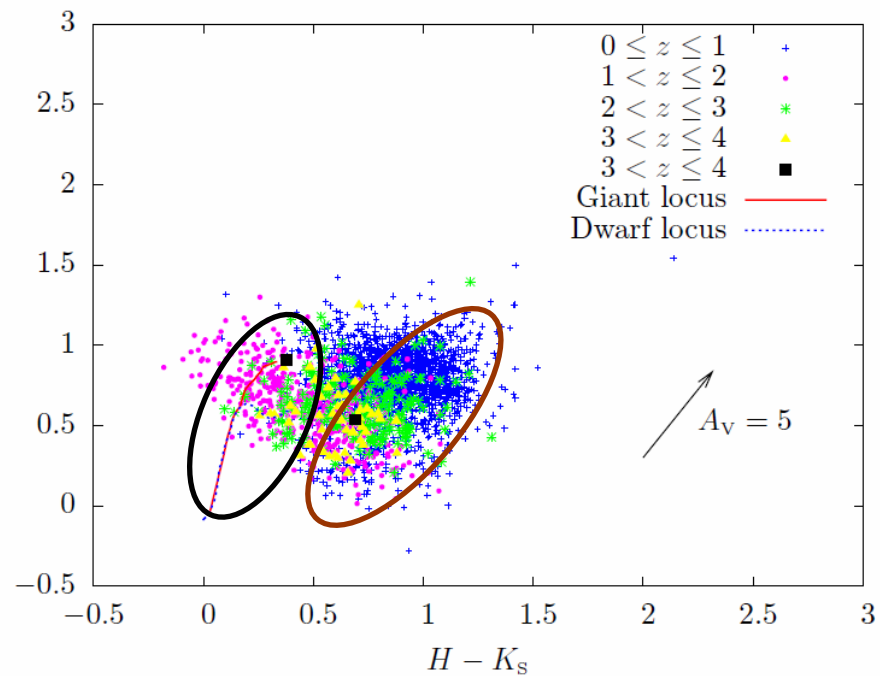
Color-color diagram (CCD)



NIR CCD of quasars/AGNs

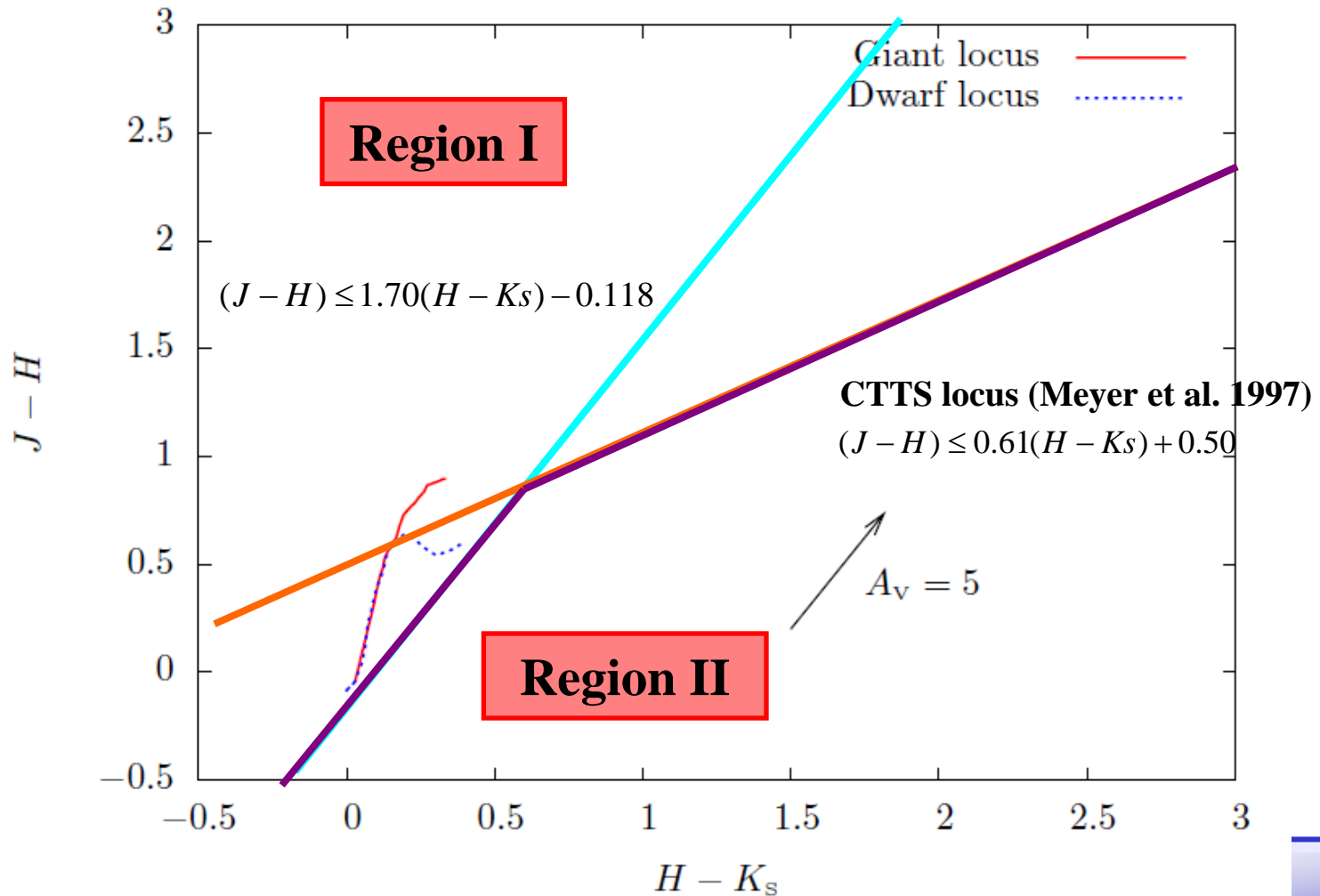


Quasars and Active Galactic Nuclei (12th Ed.)
(Veron-Cetty & Veron 2006)



SDSS-DR5 quasar catalog
(Schneider et al. 2007)

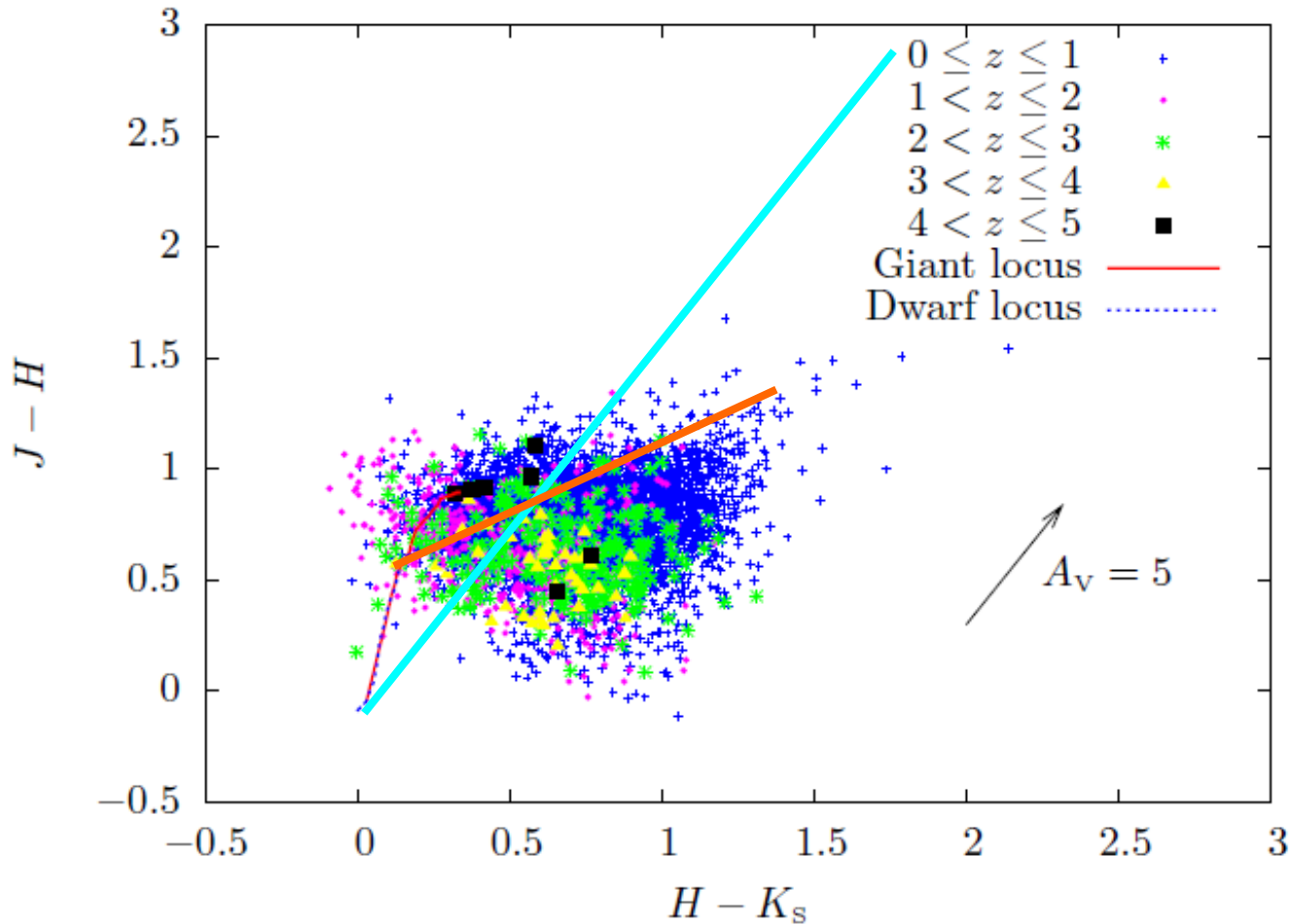
NIR color selection criteria



NIR color of quasars/AGNs

—catalogued AGNs

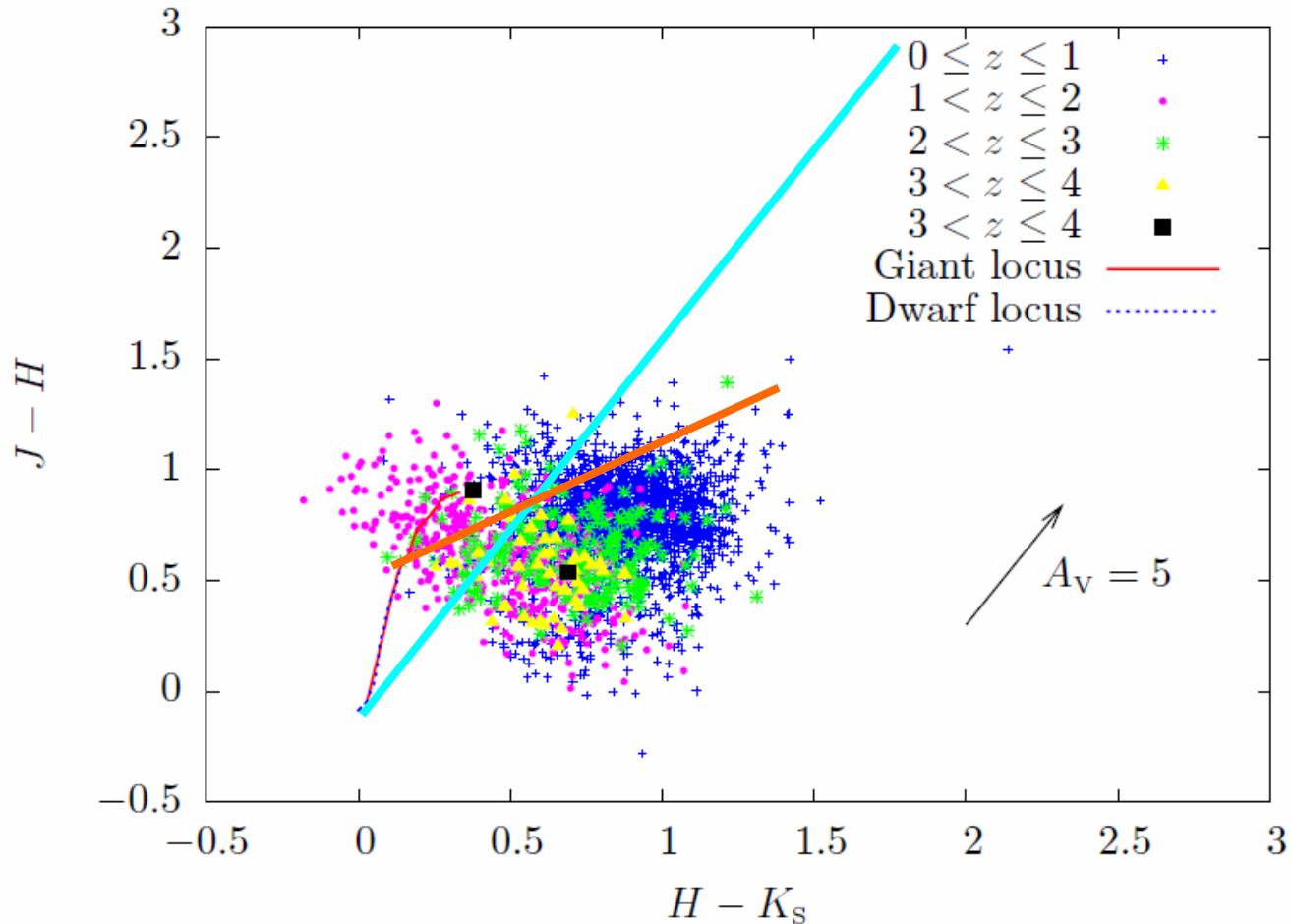
Quasars and Active Galactic Nuclei (12th Ed.) (Veron-Cetty & Veron 2006)



NIR color of quasars/AGNs

—catalogued quasars

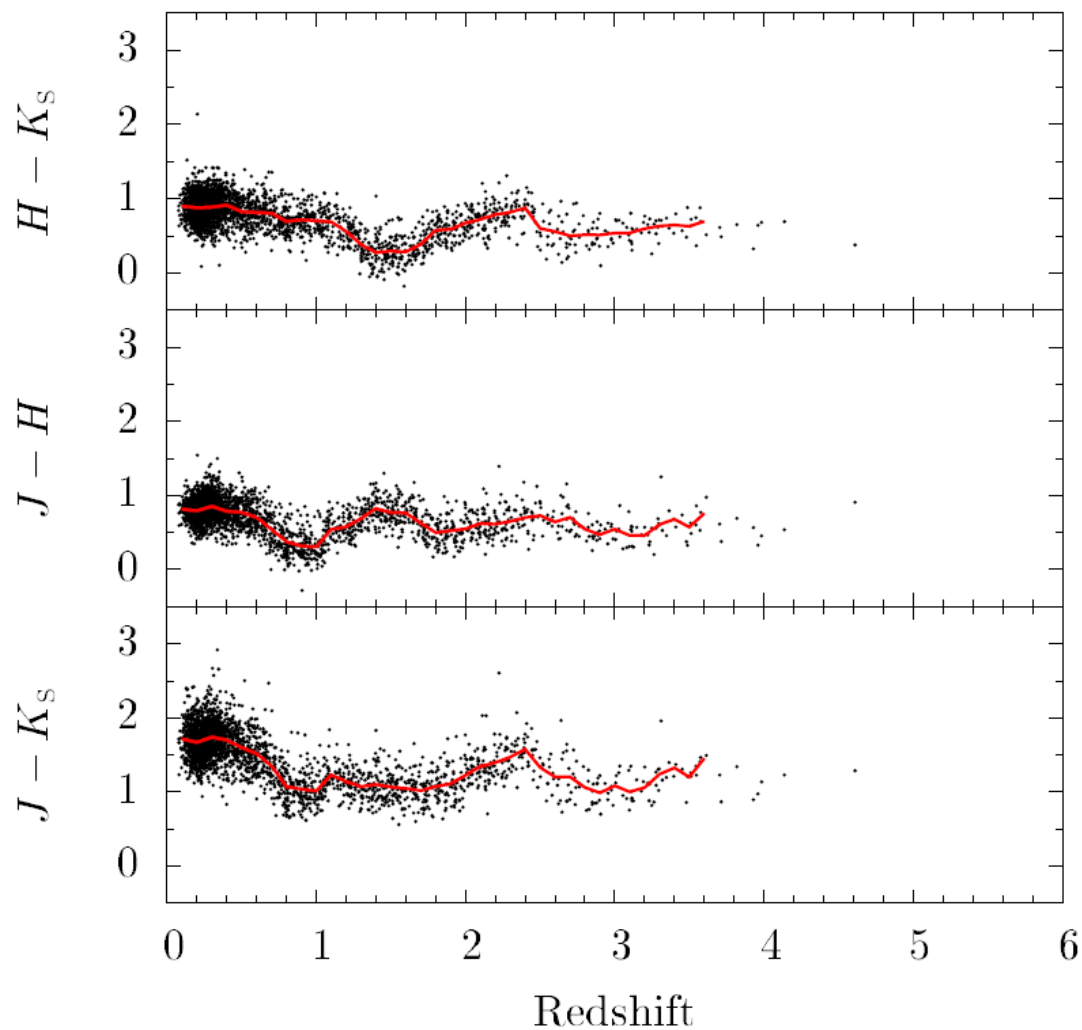
SDSS-DR5 quasar catalog (Schneider et al. 2007)



The number of sources in each region

redshift range	Quasars and Active Galactic Nuclei (12 th Ed.)			SDSS-DR5 quasar catalog		
	Region I	Region II	total	Region I	Region II	total
$0 \leq z \leq 1$	1 671 (27)	4 480 (73)	6 151	222 (11)	1 869 (89)	2 091
$1 < z \leq 2$	238 (47)	265 (53)	503	222 (47)	249 (53)	471
$2 < z \leq 3$	67 (25)	197 (75)	264	38 (19)	165 (81)	203
$3 < z \leq 4$	7 (16)	36 (84)	43	9 (18)	41 (82)	50
$4 < z \leq 5$	5 (71)	2 (29)	7	1 (50)	1 (50)	2
total	1 998 (29)	4 970 (71)	6 968	500 (18)	2 317 (82)	2 817

NIR color evolution of AGN



Monte-Carlo Simulation

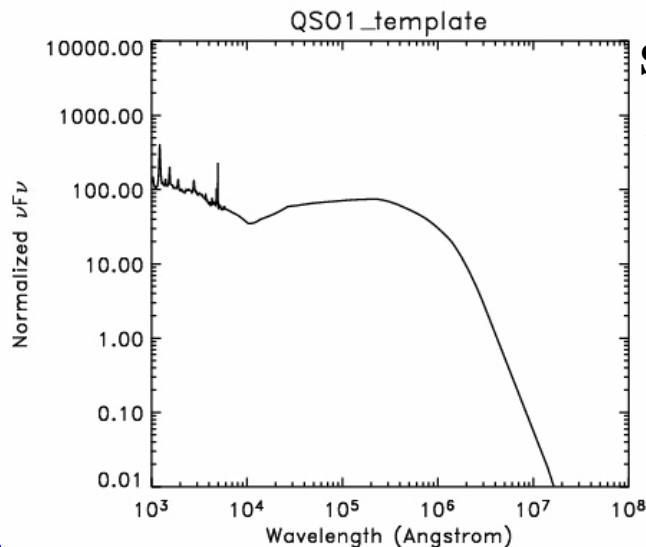
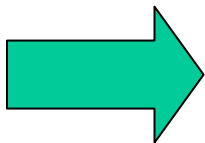
- Hyperzコード (Bolzonella et al. 2000) を利用

➡ 仮定したSEDに基づき、いくつかの測光値から **photometric redshift** を算出するコード

様々な赤方偏移での近赤外線波長での等級・色を得るために利用

Polletta et al. (2007)

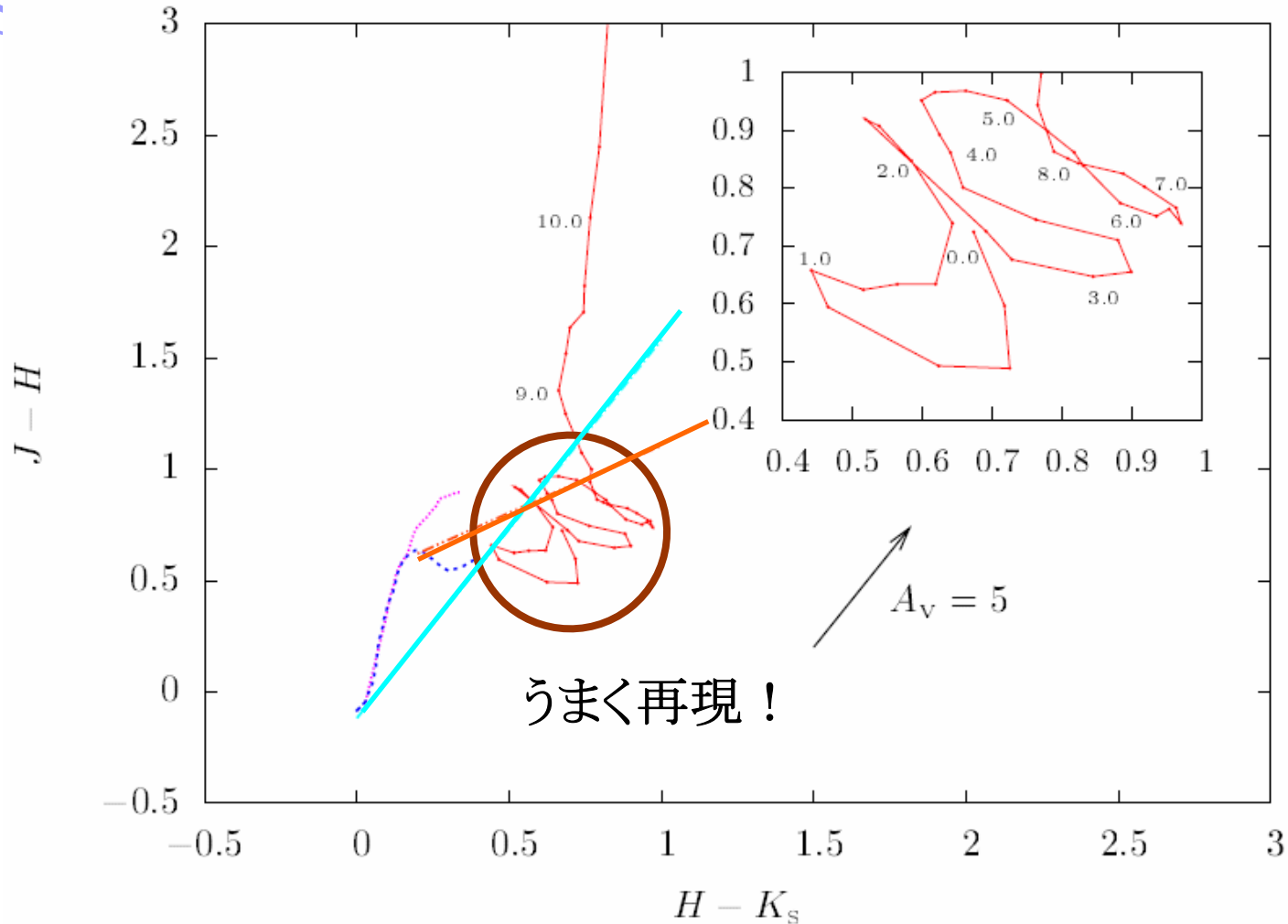
- 用いたSED



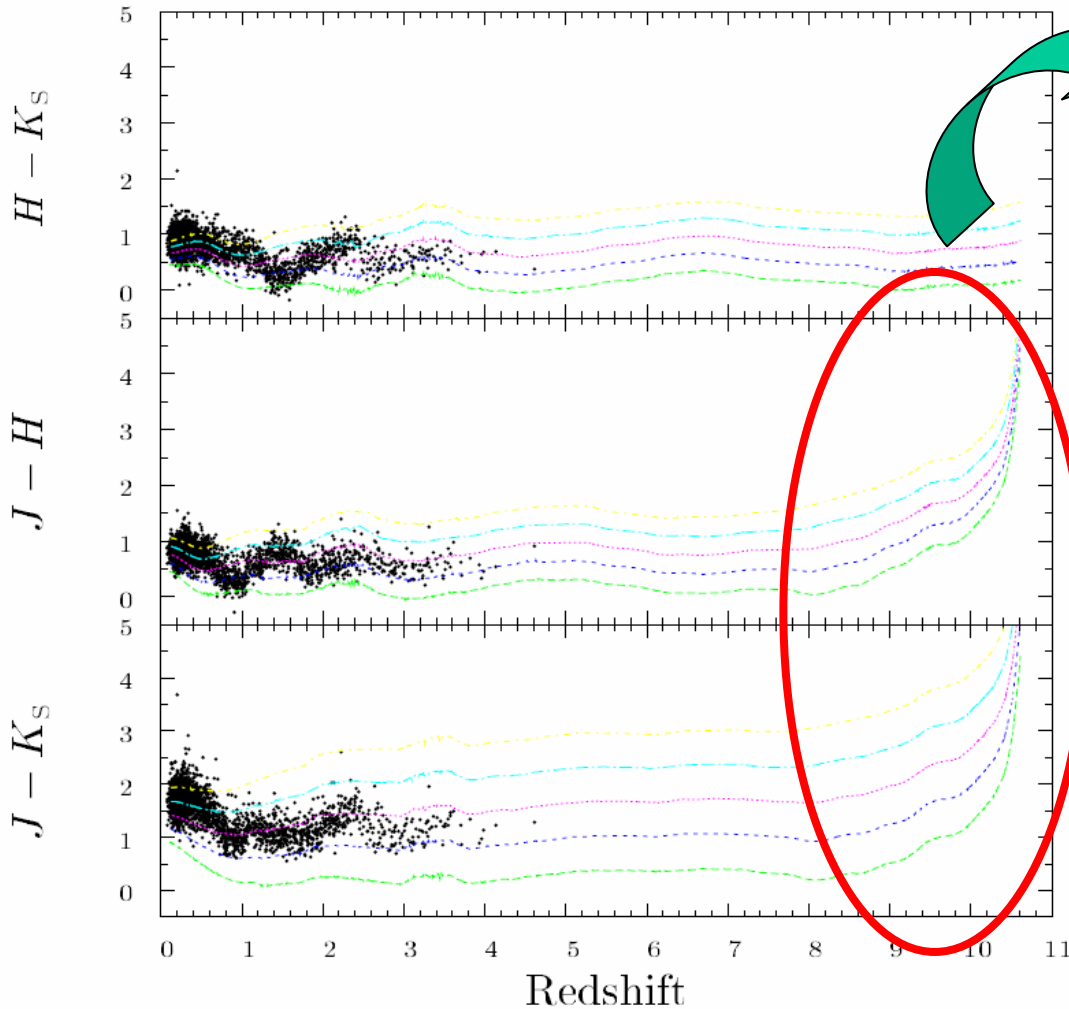
SDSSクエーサーの合成スペクトル
+ SDSS/SWIREサンプル(赤外領域)

NIR color of quasars

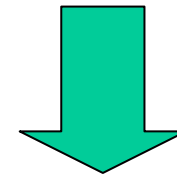
— *Simulated color*



NIR simulated color evolution



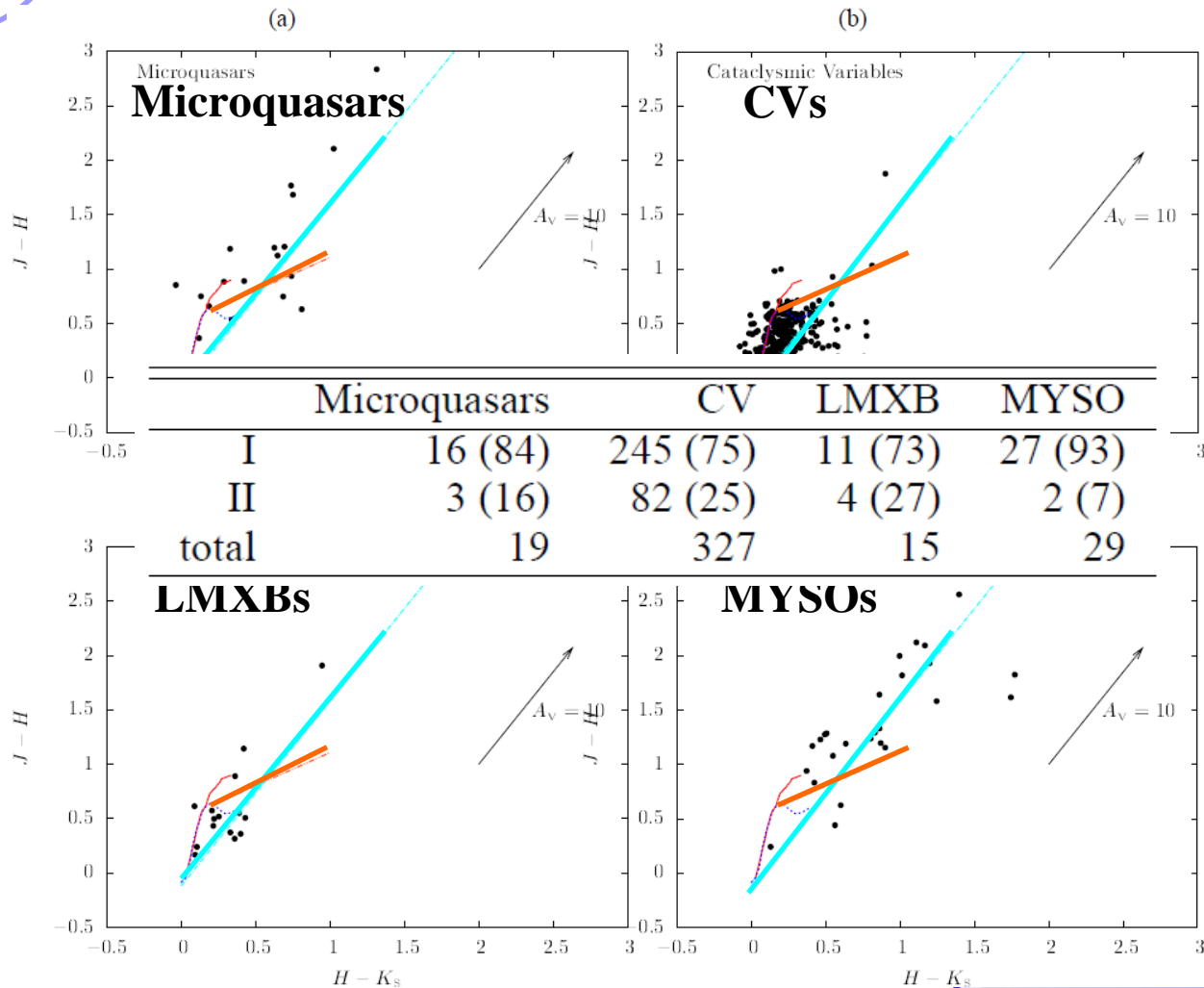
z=8~9から急激に増加



Lyman breakのシフト

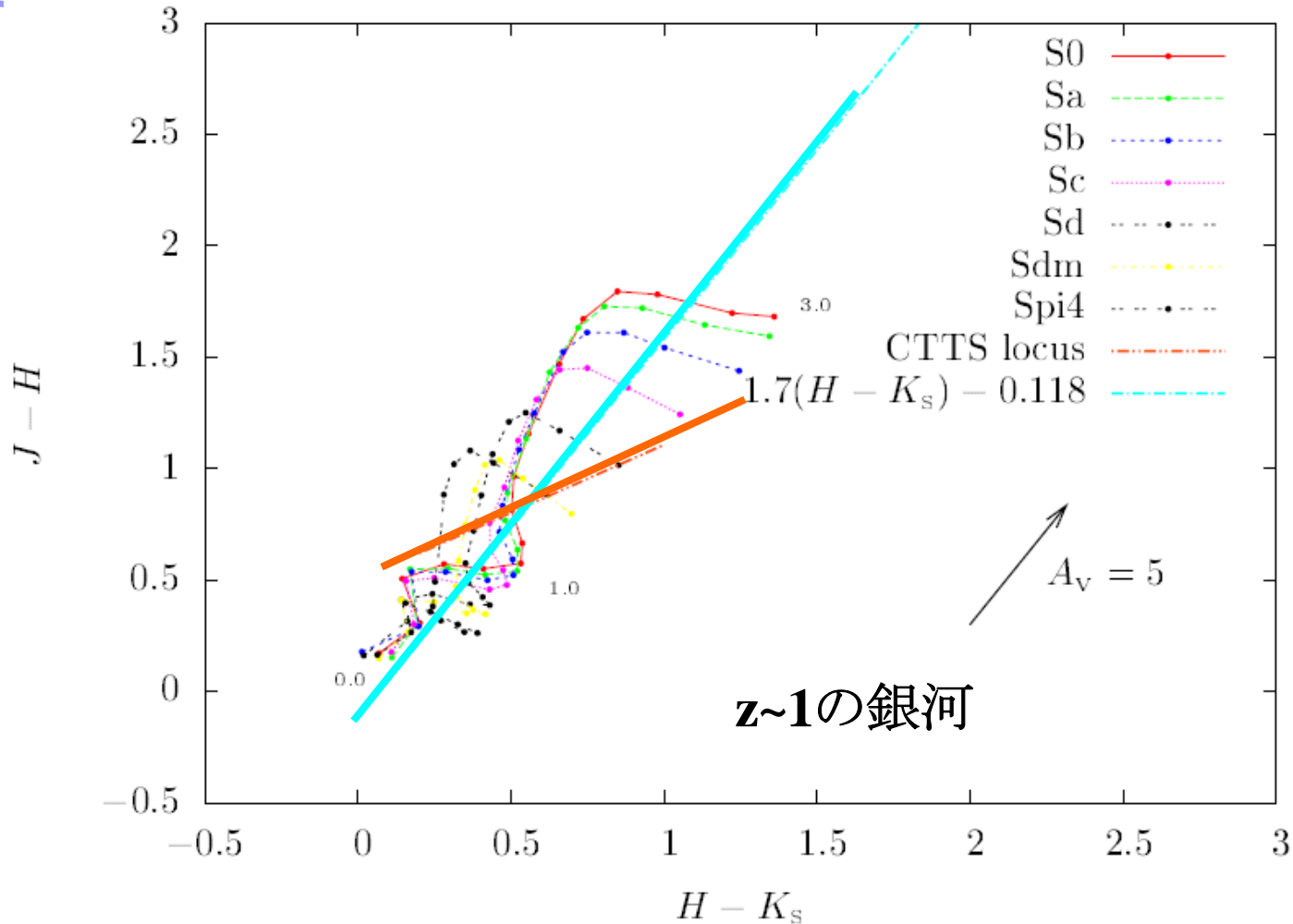
Possibility of Contamination I

— NIR color of four types of objects



Possibility of Contamination II

—NIR colors of Normal Galaxies



Summary

- クエーサー/AGNがNIR colorを用いて分離できることを示唆

NIR color selection criteria

$$\left\{ \begin{array}{l} (J - H) \leq 1.70(H - K_s) - 0.118 \\ (J - H) \leq 0.61(H - K_s) + 0.50 \end{array} \right.$$

- AGNカタログを用いたAGNのNIR colorの確認
- モンテカルロ・シミュレーションによるAGN colorの確認
- Microquasars, CVs, LMXBs, MYSOsと取り違える可能性を検討
- 渦巻銀河と取り違える可能性を検討

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